

# Service Manual

**PIONEER**

## Original

**CIRCUIT DESCRIPTIONS**



The photo shows the model KEX-900/ES.

**ORDER NO.  
CRT 1076**

**CENTRATE COMPONENT CAR STEREO  
EQUALIZER DECK**

**KEX-900** ES, EW  
**KEX-900SDK** WG

- For the repair & adjustments, please refer to the KEX-900 service manual (CRT1074).

**CENTRATE COMPONENT CAR STEREO  
CASSETTE DECK**

**KEX-500** EW  
**KEX-500SDK** WG

- For the repair & adjustments, please refer to the KEX-500 service manual (CRT1075).

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## 1. SECRET CODE

This unit is equipped with a secret code function. The secret code (4-digit) electronically locks the unit to reduce the danger of theft.

The code is preset to 0000 at the time of purchase, and the unit can be used normally without altering the code as preset. It is recommended, however, that the user change the code to another value to take full advantage of the anti-theft properties of this system.

Once a code is set, the unit will operate normally without input of the secret code, even if the ignition of the vehicle is switched OFF and then ON again. Should power to the unit be interrupted due to a battery change, repairs, or theft, however, the unit will fail to operate when power is restored unless the preset secret code is first entered. Three consecutive wrong inputs of the code will cause the unit to lock electronically to accept no input of code for three hours. Once operation is restored, three more wrong code inputs result in another three hours of electronic lock up. This feature helps to prevent breaking of the secret code through sequential or random input.

These features mean that once the power supplied to the unit is completely cut, further operation is impossible except for those who know the secret code. This makes the unit unuseable if stolen, thus reducing the danger of theft.

- When taking the unit to a service station for repair, be sure to either tell the service personnel the registered code or return the value to 0000.
- Should you forget your registered secret number, consult your local service station taking along a such proof of purchase and ownership as the original receipt, etc.

### Secret Code Registration

The secret code should be registered after all connection and installation procedures are complete. Perform the procedures outlined in "Registering the secret code" within one minute after switching the ignition key of the vehicle to ON or ACC.

The internal microprocessor will judge that a secret code has not been set if registration is not begun within one minute, if the mode switch is pressed during the one-minute period, or if an attempt is made to load a cassette. At this time, switch the ignition key OFF and then disconnect the unit's orange lead from the vehicle's battery. Then reconnect the lead and attempt secret code registration again.

### Accessory Sticker and Card

- Affix the sticker on a window of the vehicle in which the unit is installed to inform potential thieves of the anti-theft function of the unit.
- Write the secret code, unit model number, and unit serial number on the card and store it in a safe place outside of the vehicle itself. The serial number of this device is located on the bottom of the unit. This information can then be made available to the police and your PIONEER service station should your unit be stolen.

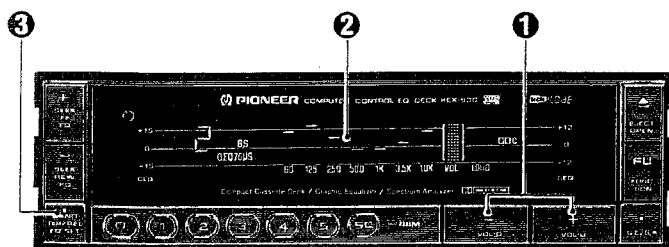


### Dealer Installation

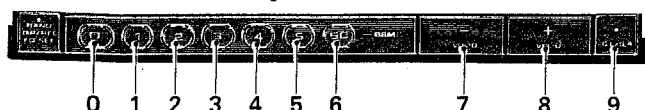
When this unit is installed by the dealer, either inform the dealer of the desired secret code for presetting or be present during the installation procedures to set the secret code yourself.

### Registering the Secret Code

KEX-900



- Switch the ignition key of the vehicle to ON or ACC.
- Simultaneously press the volume control buttons ① (+) and (−) within one minute after performing step 1.
- The message 0000 will flash on the display ② to indicate that secret code registration is now possible. During this period, the buttons illustrated below become numeric input buttons (0–9) for the purpose of secret code registration.



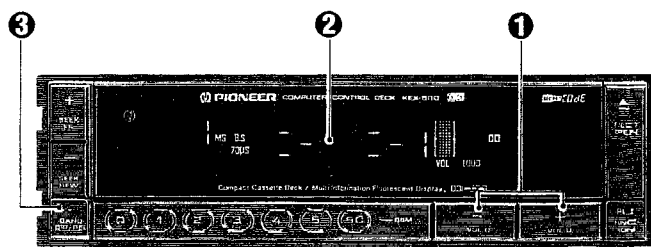
- Use the numeric input buttons to register the 4-digit secret number of your choice.

#### Ex. Registration of "8642"

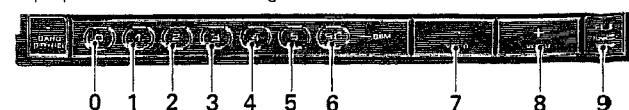
Press:

- Volume control button (+) 8
- Music Scan button 86
- Command button 4 864
- Command button 2 8642

KEX-500



- Switch the ignition key of the vehicle to ON or ACC.
- Simultaneously press the volume control buttons ① (+) and (−) within one minute after performing step 1.
- The message 0000 will flash on the display ② to indicate that secret code registration is now possible. During this period, the buttons illustrated below become numeric input buttons (0–9) for the purpose of secret code registration.



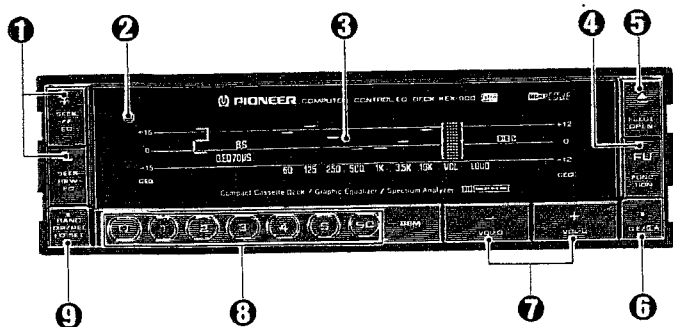
- Use the numeric input buttons to register the 4-digit secret number of your choice.

#### Ex. Registration of "8642"

Press:

- Volume control button (+) 8
- Music Scan button 86
- Command button 4 864
- Command button 2 8642

## 2. NOMENCLATURE AND USE (KEX-900)



### 1 Fast Forward (+), Rewind (-)/Level Up (+), Down (-) Button

#### Fast Forward (+), Rewind (-) Button

Control fast forward/rewind only when the display is indicating tape transport or when the spectrum analyzer is shown. The (+) button is used for fast forward, while the (-) button is used for rewind. Pressing either of these buttons twice in succession activates the music search function, and pressing a third time returns to normal playback.

#### Level Up (+), Down (-) Button

Pressing the equalizer set button while the graphic equalizer display is shown changes the function of these buttons to level up/down buttons.

### 2 Clear Button

Not used for normal operation, this button is pressed using a thin, pointed object to reset the unit when such symptoms as power supply failure, operation button failure, and abnormal display indicate misoperation of the unit's built-in microcomputer caused by noise. Pressing this button causes the message  $\square \square \square \square$  to appear on the display. Input the previously registered secret code at this time.

### 3 Display

### 4 Mode Button

Switches the power of the cassette deck ON and OFF.

- When a CD player and hide-away tuner are included in the system, each press of this button switches from cassette deck to CD player to tuner.

### 5 Open/Eject Button

Opens the flip down control panel. Press again to eject the cassette tape from the deck.

### 6 Display Select Button

Switches the contents of the display from tape transport, to spectrum analyzer, to graphic equalizer.

### 7 Volume/Attenuator Button

Pressing (+) increases volume while (-) decreases volume. Simultaneously pressing (+) and (-) immediately cuts the volume to 1/10 of its current setting. The volume display flashes at this time to indicate that the volume is attenuated. Simultaneously pressing the two buttons again returns the volume to its original level.

### 8 Command (0-5)/Music Scan (SC)/Equalizer Preset, Frequency Select Button

#### Command Buttons (0-5)

Sets the number of selections to be skipped in the skip search function when pressed while the tape transport display or spectrum analyzer display is shown.

#### Music Scan Button (SC)

Plays back 10 seconds of each successive selection when pressed while the tape transport display or spectrum analyzer display is shown. Pressing the release button cancels this function and resumes normal playback when the desired selection is located.

### Equalizer Preset, Frequency Select Button

Presetting up to three equalizer curves (user preset curves) to buttons 0 through 2 allows instant recall when one of the buttons is pressed while the equalizer display is shown. Pressing button 3 through 5 selects one of three factory preset curves, and pressing the flat curve button (SC) recalls an uncompensated flat curve.

After the equalizer set button is pressed, these buttons function to select the desired frequency on the equalizer curve.

### 9 Program Select/Release/Equalizer Set Button

#### Program Select Button

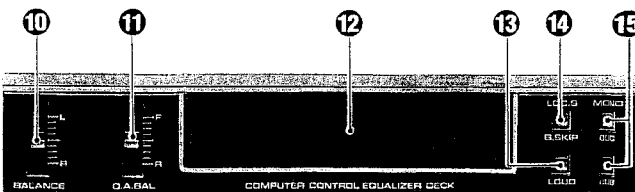
Switches the playback of the cassette tape between SIDE A and SIDE B when the tape transport display or spectrum analyzer display is shown.

#### Release Button

Cancels music scan, music search, skip search, and fast forward/rewind when pressed while the tape transport display or spectrum analyzer display is shown.

#### Equalizer Set Button

Allows creation of an equalizer curve using the frequency select button and level up/down buttons when pressed while the equalizer display is shown. This button is pressed once again to exit the equalizer set mode after the curve is set to the desired configuration.



(Flip-Down Control Panel Section)

### 10 Balance Control

### 11 Dual-amp Balance Control

Adjusts the balance between the front and rear speakers for a 2-amp/4-speaker system. Sliding towards F cuts the volume of the rear speakers, while sliding towards R cuts the volume of the front speakers.

### 12 Cassette Insertion Slot

### 13 Loudness Button

Compensates the low and high ranges when pressed to improve output at low volume.

### 14 Blank Skip Button

Sets the unit to automatically skip past long unrecorded portions (longer than 10 seconds) between selections or at the end of the tape. The B.S indicator is shown on the display while this function is activated.

### 15 Dolby NR Button

Activates the Dolby NR system to improve the signal-to-noise ratio and cut tape hiss.  $\square \square$  is shown on the display when Dolby B Type NR is selected, while  $\square \square$  C indicates Dolby C Type NR.

- If an input error is made, simply reinput the correct secret code from the beginning. The last four values input are registered as the secret code.
- 5. The entered value is registered as the secret code by pressing the program switching button ③ after input is complete. The display ② will be cleared once this is done and normal operation of the unit will be possible. Be sure to attempt operation only after thoroughly reading the owner's manual.

#### Interruption of Power Supply

Interruption the power supplied to the unit caused by battery replacement, repair or theft of the unit causes the message `CODE` to flash on the display once power supply is resumed and the ignition key of the vehicle is switched to ON or ACC. At this time the previously registered secret code should be entered using the following procedures:

1. Use the numeric input buttons (see "Registering the secret code") to enter the previously registered 4-digit secret code.
2. Press the program switching ③ button. The message `PASS` will appear on the display, an audible beep will sound, and normal operation will resume if the number entered matches the secret code registered before the power to the unit was interrupted. If the two numbers do not match, `CODE` will flash on the display again and the unit will await input of the correct value:

#### Anti-theft Function

These consecutive inputs of values which do not match the previously registered secret code activates an error timer causing the message `ERR` to appear on the display. Once this occurs, all operation of the unit, including code input, will be impossible for three hours. The message `CODE` will return after three hours have passed. The anti-theft function will operate for all subsequent input until the correct value is entered.

#### Changing the Secret Code

1. Switch the ignition key of the vehicle OFF. Disconnect the unit's orange connecting cord from the battery of the vehicle and then reconnect it.
2. Switch the ignition key of the vehicle to ON or ACC and the message `CODE` will flash on the display indicating that the unit is waiting for input of a secret code.
3. Use the numeric input buttons (see "Registering the secret code") to enter the previously registered 4-digit secret code.
4. Press the program switching button ③. The message `PASS` will appear on the display, an audible beep will sound, and normal operation will resume if the number entered matches the secret code registered before the power to the unit was interrupted. If the two numbers do not match, `CODE` will flash on the display again and the unit will await input of the correct value.
5. Simultaneously press the volume control buttons ① (+) and (-) within one minute after performing step 4.
6. The message `CODE` will flash on the display ② to indicate it is now possible to change the registered secret code.
7. Use the numeric input buttons to register the 4-digit secret number of your choice.
8. The entered value is registered as the new secret code by pressing the program switching button ③ after input is complete. The display will be cleared once this is done.

## CAUTION

Read the following in combination with the corresponding sections in the Owner's Manual.

#### Registering the Secret Code

Set the ignition of the vehicle to ON or ACC, and then **be sure to register the secret code within one minute after pressing the clear button.**

- Subsequent procedures should be performed as outlined in the Owner's Manual.

#### Anti-theft Function

The message `ERR` appears on the display when wrong secret codes are entered three times in succession. The following procedure can be used to enter the correct secret code when the `ERR` message is shown on the display.

1. **Press the clear button** and switch the ignition of the vehicle OFF.
  2. Leave the ignition of the vehicle OFF **for three hours.**
  3. Switch the ignition **ON within one hour** from the point in time that the three hour period is completed (i.e. if the clear button is pressed at 1:00, the ignition should be switched on sometime between 4:00 and 5:00).
  4. Enter the correct secret code once the message `CODE` begins to flash on the display. The message `PASS` appears when the secret code is entered correctly.
- Note that leaving the ignition OFF for more than four hours in step 2 will cause the `ERR` message to remain on the display when ignition is finally switched ON. In such a case, steps 1 through 4 must be repeated to enter the correct secret code.



## 3 Blank Skip Display

Lights when the blank skip button is pressed.

## 4 Music Scan Display

Lights when the music scan button is pressed. The music scan function is in operation while this indicator is lit.

## 5 Tape Transport/Spectrum Analyzer/Graphic Equalizer

Each press of the display select button causes the display to change as shown in A, B, and C below.

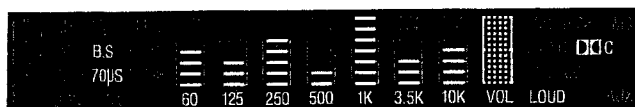
### A: Tape Transport Display

—moving from the left to the right of the display indicates normal tape transport. When tape transport is reversed, —moves from right to left. The respective indicators increase in speed for such functions as fast forward, rewind, and music search.



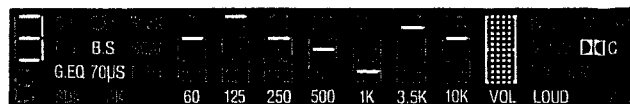
### B: Spectrum Analyzer Display

Frequency power levels are shown divided among seven frequencies.



### C: Graphic Equalizer Display

Levels are shown divided among seven frequencies. The levels indicated by the red lines on the display are the uncompensated levels. The area above the red lines is the high level, while that below the red lines is the low level.



## 6 Volume Level/Attenuator Display

Displays the volume level. The indicator at the bottom of the display is always lit, even when volume is at its minimum setting. Simultaneously pressing both volume buttons cuts the volume to 1/10 of its current setting (attenuator function) and causes the volume display to flash.

## 7 Dolby NR Display

□□ lights while the Dolby B NR button is pressed, while □□C lights while the Dolby C NR is pressed.

## 8 External Input Display

Lights when a unit (CD player) connected through the external input connector is in operation while the cassette deck is OFF.

## 9 Loudness Indicator

Appears when the loudness button is pressed to indicate that the loudness function is activated.

## 10 Frequency Display

Lights while the graphic equalizer display or spectrum analyzer display is shown.

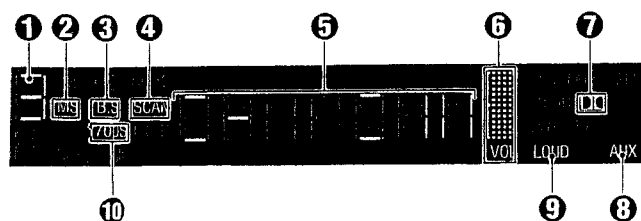
## 11 70 µs Tape Display

An automatic tape selector will switch the equalization (70 µs/120 µs) when a cassette tape is loaded into the unit. A 70 µs tape will cause 70 µs to be displayed, while a 120 µs tape will result in no display at all.

## 12 Graphic Equalizer Display

Lights along with the preset number when an equalizer preset button is pressed while the graphic equalizer display is shown.

## 5. READING THE DISPLAYS (KEX-500)



### 1 Skip Number Display

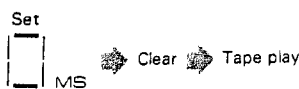
Displays the number of selections (set using the command buttons) to be skipped by the skip search function.

### 2 Music Search/Skip Search Display

MS appears on the display during music search and skip search operations.

- The display changes as shown during music search:

Ex. Locating the beginning of the current selection.



- The display changes as shown during skip search:

Ex. Locating the beginning of the second selection before the current one.



### 3 Blank Skip Display

Lights when the blank skip button is pressed.

### 4 Music Scan Display

Lights when the music scan button is pressed. The music scan function is in operation while this indicator is lit.

### 5 Tape Transport Display

—moving from the left to the right of the display indicates normal tape transport. When tape transport is reversed, —moves from right to left. The respective indicators increase in speed for such functions as fast forward, rewind, and music search.

### 6 Volume Level/Attenuator Display

Displays the volume level. The indicator at the bottom of the display is always lit, even when volume is at its minimum setting. Simultaneously pressing both volume buttons cuts the volume to 1/10 of its current setting (attenuator function) and causes the volume display to flash.

### 7 Dolby NR Display

□□ will light when the Dolby NR button is pressed.

### 8 External Input Display

Lights when a unit (CD player) connected through the external input connector is in operation while the cassette deck is OFF.

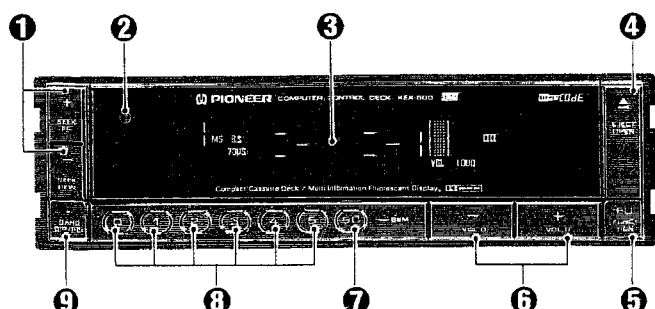
### 9 Loudness Indicator

Appears when the loudness button is pressed to indicate that the loudness function is activated.

### 10 70 µs Tape Display

An automatic tape selector will switch the equalization (70 µs/120 µs) when a cassette tape is loaded into the unit. A 70 µs tape will cause 70 µs to be displayed, while a 120 µs tape will result in no display at all.

### 3. NOMENCLATURE AND USE (KEX-500)



#### 1 Fast Forward (+)/Rewind (-) Button

The (+) button is used for fast forward, while the (-) button is used for rewind. Pressing either of these buttons twice in succession activates the music search function, and pressing a third time returns to normal playback.

#### 2 Clear Button

Not used for normal operation, this button is pressed using a thin, pointed object to reset the unit when such symptoms as power supply failure, operation button failure, and abnormal display indicate misoperation of the unit's built-in microcomputer caused by noise. Pressing this button causes the message **CE** to appear on the display. Input the previously registered secret code at this time.

#### 3 Display

#### 4 Open/Eject Button

Opens the flip down control panel. Press again to eject the cassette tape from the deck.

#### 5 Mode Button

Switches the power of the cassette deck ON and OFF.

- When a CD player and hide-away tuner are included in the system, each press of this button switches from cassette deck to CD player to tuner.

#### 6 Volume/Attenuator Button

Pressing (+) increases volume while (-) decreases volume. Simultaneously pressing (+) and (-) immediately cuts the volume to 1/10 of its current setting. The volume display flashes at this time to indicate that the volume is attenuated. Simultaneously pressing the two buttons again returns the volume to its original level.

#### 7 Music Scan Button

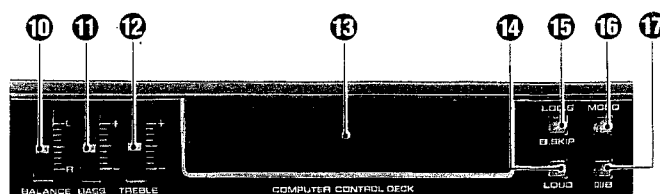
Plays back 10 seconds of each successive selection when pressed. Pressing the release button cancels this function and resumes normal playback when the desired selection is located.

#### 8 Command Buttons

Sets the number of selections to be skipped by the skip search function.

#### 9 Program Switching/Release Button

Press this button to switch from side A to side B and vice versa. Also, you can press this button to cancel music scan, search, skip search, and fast forward or rewind.



(Flip-Down Control Panel Section)

#### 10 Balance Control

#### 11 Bass Control

#### 12 Treble Control

#### 13 Cassette Insertion Slot

#### 14 Loudness Button

Compensates the low and high ranges when pressed to improve output at low volume.

#### 15 Blank Skip Button

Sets the unit to automatically skip past long unrecorded portions (longer than 10 seconds) between selections or at the end of the tape. The B.S indicator is shown on the display while this function is activated.

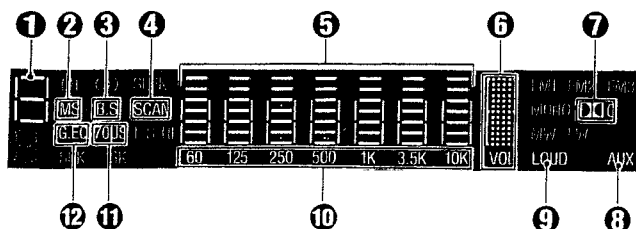
#### 16 FM Stereo/Monaural Button

Used when a hide-away tuner is included in the system.

#### 17 Dolby NR Button

Press when playing a tape recorded with a Dolby NR. (NR appears on the display).

### 4. READING THE DISPLAYS (KEX-900)



#### 1 Skip/Equalizer Preset Number

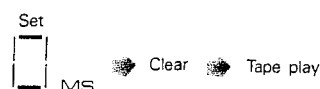
Shows the number of selections skipped by the skip search function. Also shows the preset number (0-5, F) when the equalizer preset button is pressed.

#### 2 Music Search/Skip Search Display

MS appears on the display during music search and skip search operations.

- The display changes as shown during music search:

Ex. Locating the beginning of the current selection.

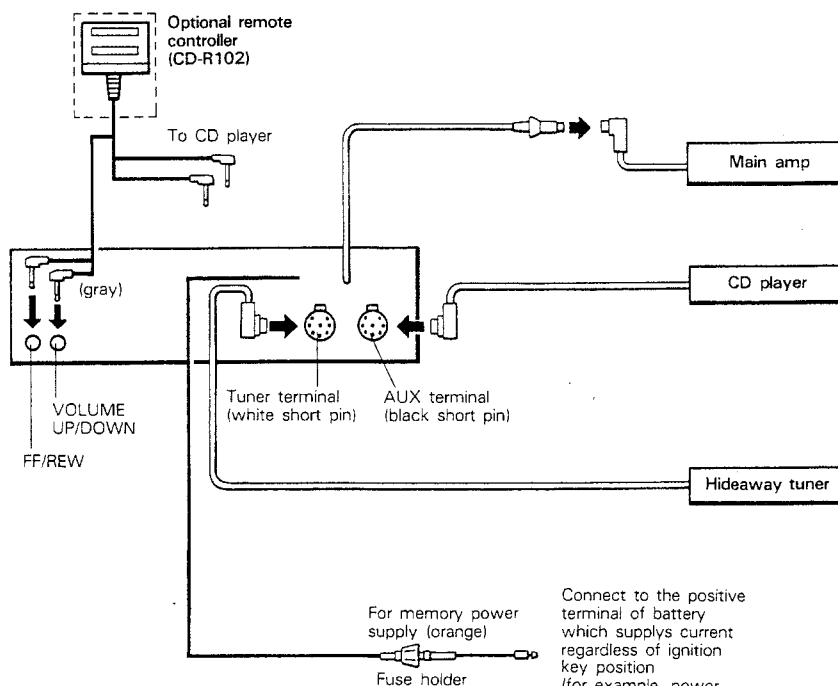


- The display changes as shown during skip search:

Ex. Locating the beginning of the second selection before the current one.



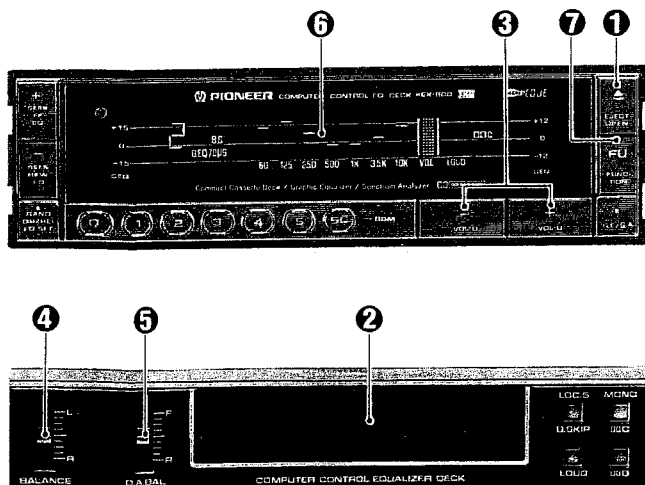
## • KEX-500



- Always leave short pit in place when tuner terminal and AUX terminal are not used.

## 7. PLAYBACK

### • KEX-900

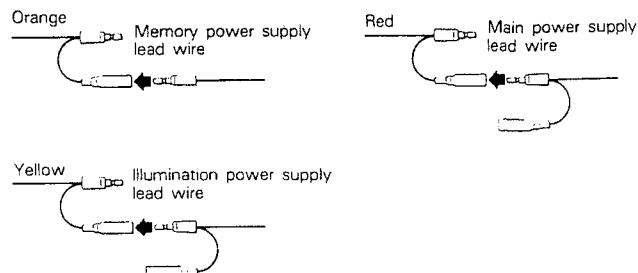


(Flip-Down Control Panel Section)

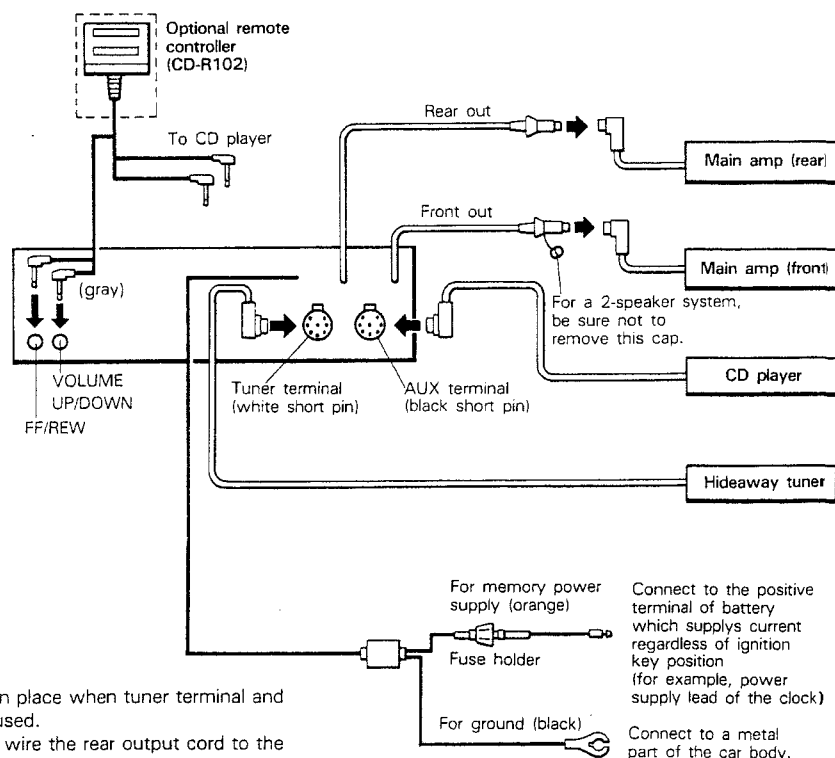
1. With the ignition switch in the ON or ACC position, press the open button ① and the flip-down control panel will open.
  2. Insert a cassette tape into the tape slot ②. The deck will automatically set the tape and begin playback.
  3. Adjust the volume ③, balance ④, and dual amp balancer ⑤ (for 4-speaker systems) to the desired levels.
  4. Close the flip-down control panel ⑥.
  5. Press the mode button ⑦ to stop tape transport. Press again to resume tape transport.
  6. To remove a tape, press the open/eject button ① and the flip-down control panel will open. Press the button once more and the cassette will eject.
- The cassette tape will automatically be ejected after a few seconds if it fails to be set. Reinsert the tape and try to set it again.
  - A loose or warped label on a cassette tape may interfere with the eject mechanism of the unit or cause the cassette to become jammed in the unit. Avoid using such tapes or remove such labels from the cassette before attempting use.

## 6. CONNECTING THE UNITS

- Before making final connections, make temporary connections then operate the unit to check for any connecting cord problems.
- Refer to the owner's manual for details on connecting the various cords of the main amp and other units then make connections correctly.
- Be sure to correctly connect the memory power supply lead (orange) as specified. If the connection is made incorrectly or forgotten, this unit will not work at all.
- Don't pass the memory power supply lead (orange) through a hole into the engine compartment to connect to the battery. This will damage the lead insulation and cause a very dangerous short.
- If you should encounter more than two lead wires of the same color, when wiring connections, it will be convenient to wire them together, as shown in the following diagram.



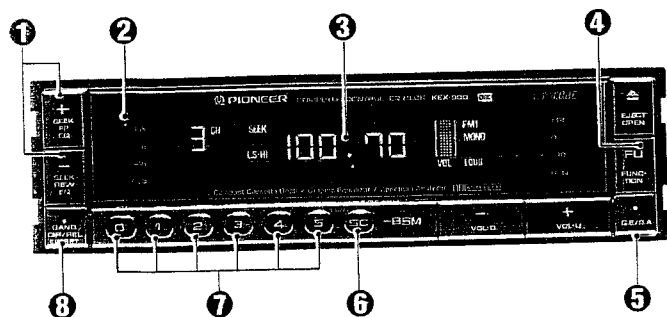
### • KEX-900



- Always leave short pit in place when tuner terminal and AUX terminal are not used.
- For 2-speaker systems, wire the rear output cord to the main amp.

## 9. NOMENCLATURE AND USE (TUNER SECTION)

### • KEX-900



#### 1 Seek/Manual Tuning Button

Simultaneously pressing these two buttons switches between manual and seek tuning.

##### Seek Tuning (SEEK appears on display)

Automatically tunes in the nearest receivable frequency. Pressing (+) tunes in the nearest higher receivable frequency, while pressing (-) tunes in the nearest lower receivable frequency.

##### Manual Tuning

Each press of (+) increases FM frequencies in 50 kHz steps, MW frequencies in 9 kHz steps, and LW frequencies in 1 kHz steps. Each press of (-) decreases frequencies in the same steps. Pressing and holding down either button causes high speed changes in the frequency according to the respective steps.

#### 2 Clear Button

Not used for normal operation, this button is pressed using a thin, pointed object to reset the unit when such symptoms as power supply failure, operation button failure, and abnormal display indicate misoperation of the unit's built-in microcomputer caused by noise. Pressing this button causes the message **CODE** to appear on the display. Input the previously registered secret code at this time.

#### 3 Display

#### 4 Mode Button

Switches from cassette deck to power OFF to tuner.

- When the AUX terminal is used, this button switches from cassette deck, to AUX (CD player, etc.), to tuner.
- This button may not function properly when the unit is first installed, and it may be impossible to switch to the tuner mode. In this case, pressing the clear button should allow normal operation.

#### 5 Display Select Button

Switches the display contents from reception frequency, to spectrum analyzer, to graphic equalizer.

#### 6 Preset Scan Tuning/Best Station Memory Button

##### Preset Scan Tuning Button

Sequentially recalls frequencies assigned to the preset buttons for play of approximately eight seconds each. Pressing the release button cancels this function when a desired function is located.

##### Best Station Memory Button

Automatically tunes strong frequencies and assigns them to preset buttons 0 through 5 for one-touch automatic tuning. The best station memory function is activated by pressing and holding down this button until a beep is heard (approximately two seconds). The best station memory function is indicated by ----- flashing on the display, and this function can be canceled by pressing the release button.

- The frequencies previously assigned to the preset buttons are retained when six strong frequencies cannot be located.
- The best station memory function does not operate during preset scan tuning. To use the best station memory function, first use the release button to cancel preset scan tuning.
- The best station memory is operational while ----- is flashing on the display.

#### 7 Frequency Preset/Memory Buttons

##### Frequency Preset

Assignment of FM/MW/LW frequencies to these buttons allows one-touch tuning. 18 frequencies (6 for FM1, 6 for FM2, 6 for FM3) and 6 MW/LW frequencies can be assigned for a total of 24 different frequencies.

##### Memory

Frequencies tuned using seek or manual tuning can be assigned to memory by pressing and holding down the desired button until a beep is heard (approximately two seconds).

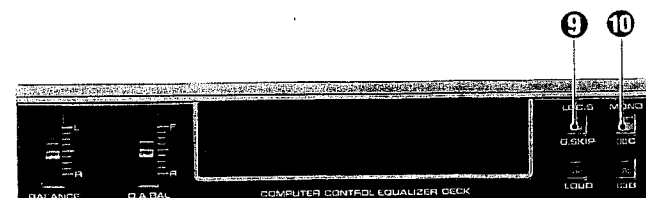
#### 8 Band Select/Release Button

Switches bands in the following sequence:

FM1 → FM2 → FM3 → MW/LW

Also cancels seek tuning, preset scan tuning, and the best station memory function.

- Switching between FM and MW/LW is performed using the band select button. Switching between LW and MW is accomplished using the tuning button. The MW band is from 531 kHz to 1,602 kHz, and the LW band is from 153 kHz to 281 kHz.



• (Flip-Down Control Panel Section)

#### 9 Local Station Button

Switches the seek level sensitivity of the seek tuning function among three levels in the following sequence:

OFF → L.S → L.S-HI

The OFF level has the greatest sensitivity, while the L.S-HI setting will tune in only the strongest broadcasts.

#### 10 FM Stereo/Monaural Button

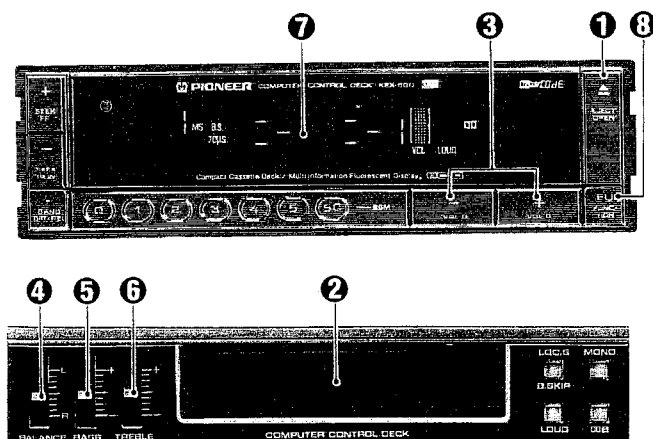
Switches between stereo and monaural for FM broadcasts. This button is usually left in the stereo setting for enjoyment of stereo broadcasts signaled by the stereo indicator appearing on the display. This setting also allows clear sound quality when the ARC (automatic reception control) circuit is activated. This button should only be used in the manual setting when the FM broadcast is being interfered with by excessive noise.

#### System Remote Control Unit CD-R102 (Option)

Connection of the optional CD-R102 allows remote control of seek and manual tuning within easy reach.

- All the press type control buttons have an electronic sound (beep) and display for dual confirmation of operation.

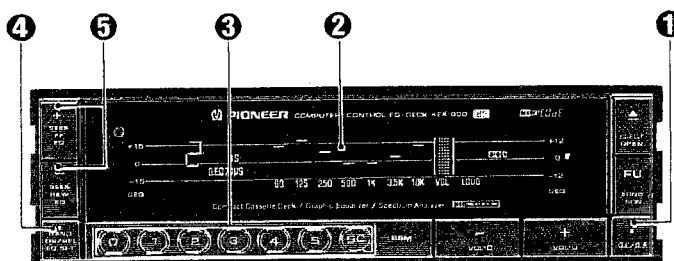
## • KEX-500



(Flip-Down Control Panel Section)

1. With the ignition switch in the ON or ACC position, press the open button **1** and the flip-down control panel will open.
2. Insert a cassette tape into the tape slot **2**. The deck will automatically set the tape and begin playback.
3. Adjust volume **3**, balance **4**, bass **5**, and treble **6** controls as you like.
4. Close the flip-down control panel **7**.
5. Press the mode button **8** to stop tape transport. Press again to resume tape transport.
6. To remove a tape, press the open/eject button **1** and the flip-down control panel will open. Press the button once more and the cassette will eject.
  - The cassette tape will automatically be ejected after a few seconds if it fails to be set. Reinsert the tape and try to set it again.
  - A loose or warped label on a cassette tape may interfere with the eject mechanism of the unit or cause the cassette to become jammed in the unit. Avoid using such tapes or remove such labels from the cassette before attempting use.

## 8. USING THE GRAPHIC EQUALIZER (KEX-900)

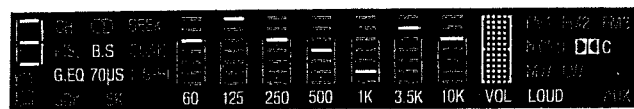


### Factory Preset Curves

1. Press the display select button **1** to switch the display **2** to the graphic equalizer curve.
2. Pressing equalizer preset button 3, 4, 5 or SC **3** will cause one of the following equalizer curves to appear on the display.

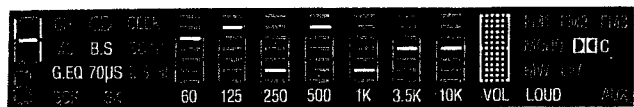
#### ③ : Equalizer Powerful Curve

Compensates for the frequency characteristics inside of the vehicle while enhancing the low and high ranges to produce a powerful sound.



#### ④ : Rear Speaker Equalizer Curve

Compensates for the frequency characteristics inside of the vehicle to produce the equivalent of a flat curve (in most vehicles).



#### ⑤ : Powerful Curve

Enhances the low and high ranges to produces a powerful curve.



#### SC : Flat Curve

An uncompensated flat curve that can be used as a reference to determine the effects of the other curves.

### Forming Equalizer Curves

1. Pressing the equalizer set button **4** causes the equalizer preset buttons **3** (0-5, SC) to function as frequency select buttons.
2. Select the frequency to be adjusted using the frequency select buttons (the display of the selected frequency will flash).
3. Use the level up (+)/down (-) buttons **5** to set the frequency to the desired level.
  - Repeat steps 2 and 3 to adjust the other frequencies.
4. Press the equalizer set button once again when settings are complete.
- User preset curves based on a factory preset curve by first calling the desired factory preset curve.

### Recording to Memory.

Once an equalizer curve is created, the following operation is used to assign the curve to preset buttons 0 through 2.

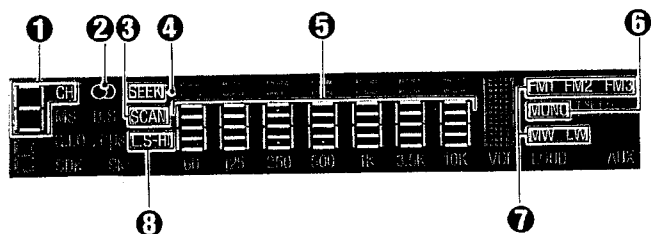
5. Press and hold down one of the equalizer curve preset buttons (0-2) until a beep is heard (approximately 2 seconds). This signals that the curve has been stored in memory under the preset button pressed.
  - The procedure outlined above can be used to create and store up to three equalizer curves.
  - The level can be adjusted within  $\pm 15$  dB in the low range (60 Hz, 125 Hz).

#### Note:

- If the program source does not include components in the vicinity of 60 Hz, or if small diameter speakers are used, little change will be noticeable even if the 60 Hz frequency level is adjusted.

## 10. READING THE DISPLAY (TUNER SECTION)

### • KEX-900



#### 1 Preset Number Display

Indicates the number of the preset button pressed to tune in the current frequency.

#### 2 FM Stereo Indicator

Indicates reception of a strong FM stereo broadcast.

#### 3 Preset Scan Tuning Display

Indicates operation of the preset scan tuning function.

#### 4 Seek Tuning Indicator

Indicates operation of the seek tuning function.

#### 5 Frequency Indicator

Shows ----- while the best station memory function is in operation.

#### 6 FM Monaural Indicator

Indicates reception of an FM broadcast while the stereo/monaural button is in the monaural position.

#### 7 Band Indicator

Indicates the band, switching in the sequences FM1 → FM2 → FM3 → MW/LW → FM1... with each press of the band select button.

#### 8 Local Station Indicator

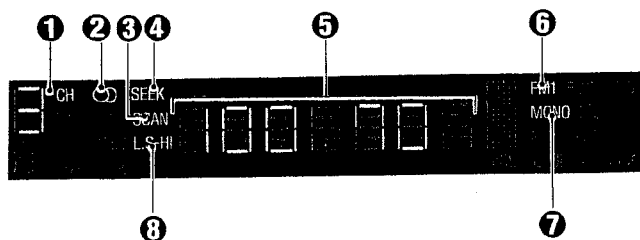
Indicates the seek level during operation of the seek tuning function.

L.S-HI: Low sensitivity

L.S: Medium sensitivity

OFF (no display): High sensitivity

### • KEX-500



#### 1 Preset Number Display

Indicates the number of the preset button pressed to tune in the current frequency.

#### 2 FM Stereo Indicator

Indicates reception of a strong FM stereo broadcast.

#### 3 Preset Scan Tuning Display

Indicates operation of the preset scan tuning function.

#### 4 Seek Tuning Indicator

Indicates operation of the seek tuning function.

#### 5 Frequency Indicator

Shows ----- while the best station memory function is in operation.

#### 6 Band Indicator

Indicates the band, switching in the sequences FM1 → FM2 → FM3 → MW/LW → FM1... with each press of the band select button.

#### 7 FM Monaural Indicator

Indicates reception of an FM broadcast while the stereo/monaural button is in the monaural position.

#### 8 Local Station Indicator

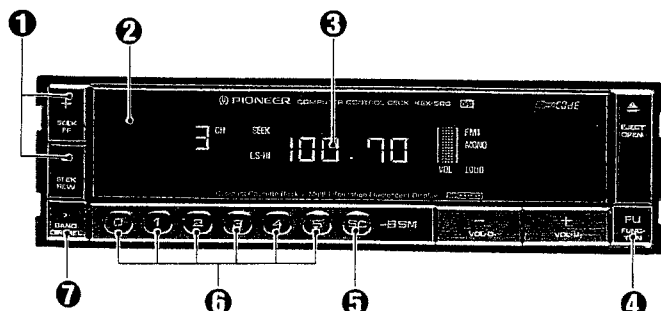
Indicates the seek level during operation of the seek tuning function.

L.S-HI: Low sensitivity

L.S: Medium sensitivity

OFF (no display): High sensitivity

# **• KEX-500**



## **1 Seek/Manual Tuning Button**

Simultaneously pressing these two buttons switches between manual and seek tuning.

### **Seek Tuning (SEEK appears on display)**

Automatically tunes in the nearest receivable frequency. Pressing (+) tunes in the nearest higher receivable frequency, while pressing (-) tunes in the nearest lower receivable frequency.

### **Manual Tuning**

Each press of (+) increases FM frequencies in 50 kHz steps, MW frequencies in 9 kHz steps, and LW frequencies in 1 kHz steps. Each press of (-) decreases frequencies in the same steps. Pressing and holding down either button causes high speed changes in the frequency according to the respective steps.

## **2 Clear Button**

Not used for normal operation, this button is pressed using a thin, pointed object to reset the unit when such symptoms as power supply failure, operation button failure, and abnormal display indicate misoperation of the unit's built-in microcomputer caused by noise. Pressing this button causes the message [ ] [ ] [ ] to appear on the display. Input the previously registered secret code at this time.

## **3 Display**

## **4 Mode Button**

Switches from cassette deck to power OFF to tuner.

- When the AUX terminal is used, this button switches from cassette deck, to AUX (CD player, etc.), to tuner.
- This button may not function properly when the unit is first installed, and it may be impossible to switch to the tuner mode. In this case, pressing the clear button should allow normal operation.

## **5 Preset Scan Tuning/Best Station Memory Button**

### **Preset Scan Tuning Button**

Sequentially recalls frequencies assigned to the preset buttons for play of approximately eight seconds each. Pressing the release button cancels this function when a desired function is located.

### **Best Station Memory Button**

Automatically tunes strong frequencies and assigns them to preset buttons 0 through 5 for one-touch automatic tuning. The best station memory function is activated by pressing and holding down this button until a beep is heard (approximately two seconds). The best station memory function is indicated by ----- flashing on the display, and this function can be canceled by pressing the release button.

- The frequencies previously assigned to the preset buttons are retained when six strong frequencies cannot be located.
- The best station memory function does not operate during preset scan tuning. To use the best station memory function, first use the release button to cancel preset scan tuning.
- The best station memory is operational while ----- is flashing on the display.

## **6 Frequency Preset/Memory Buttons**

### **Frequency Preset**

Assignment of FM/MW/LW frequencies to these buttons allows one-touch tuning. 18 frequencies (6 for FM1, 6 for FM2, 6 for FM3) and 6 MW/LW frequencies can be assigned for a total of 24 different frequencies.

### **Memory**

Frequencies tuned using seek or manual tuning can be assigned to memory by pressing and holding down the desired button until a beep is heard (approximately two seconds).

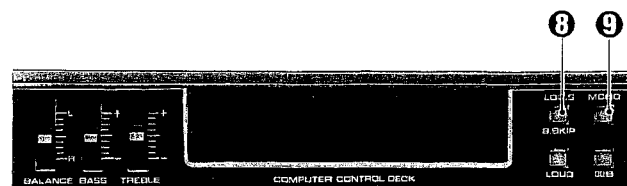
## **7 Band Select/Release Button**

Switches bands in the following sequence:

FM1 → FM2 → FM3 → MW/LW

Also cancels seek tuning, preset scan tuning, and the best station memory function.

- Switching between FM and MW/LW is performed using the band select button. Switching between LW and MW is accomplished using the tuning button. The MW band is from 531 kHz to 1,602 kHz, and the LW band is from 153 kHz to 281 kHz.



(Flip-Down Control Panel Section)

## **8 Local Station Button**

Switches the seek level sensitivity of the seek tuning function among three levels in the following sequence:

OFF → L.S → L.S-HI

The OFF level has the greatest sensitivity, while the LS-HI setting will tune in only the strongest broadcasts.

## **9 FM Stereo/Monaural Button**

Switches between stereo and monaural for FM broadcasts. This button is usually left in the stereo setting for enjoyment of stereo broadcasts signaled by the stereo indicator appearing on the display. This setting also allows clear sound quality when the ARC (automatic reception control) circuit is activated. This button should only be used in the manual setting when the FM broadcast is being interfered with by excessive noise.

## **System Remote Control Unit CD-R102 (Option)**

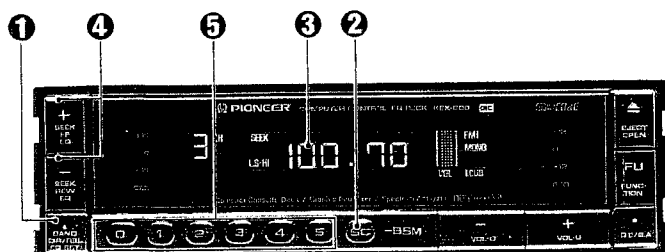
Connection of the optional CD-R102 allows remote control of seek and manual tuning within easy reach.

- All the press type control buttons have an electronic sound (beep) and display for dual confirmation of operation.



## 12. ASSIGNING FREQUENCIES TO MEMORY

### • KEX-900

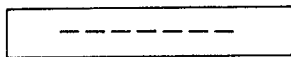


Frequently listened to frequencies can be assigned to preset buttons for later one-touch tuning. Frequencies can be assigned using either the best station memory function or seek/manual tuning.

#### Best Station Memory

The single touch of a button causes automatic tuning of strong broadcasts for assignment to preset buttons 0 through 5.

1. Press the band select button ① to select the desired band.
2. Press and hold down the best station memory button ② (for approximately two seconds) until the display ③ appears as illustrated below. The display flashes as illustrated to indicate that the memory function is being performed.



3. The frequency display returns once the best station memory function is complete. The frequency displayed at this time is the one assigned to preset button ① by the best station memory function.

#### Seek/Manual Tuning

1. Press the band select button ① to select FM1, FM2, FM3 or MW/LW.
  2. Press the (+) or (-) tuning button ④ to tune in the desired frequency.
  3. Press and hold down (for approximately two seconds) one of the preset buttons ⑤ until a beep sound is heard to indicate that assignment is complete. At this time the display ③ should show the number that corresponds to the preset button pressed.
  4. Frequencies can be assigned to the remaining preset buttons by repeating steps 2 and 3.
- 18 FM frequencies (6 for FM1, 6 for FM2, 6 for FM3) and 6 MW/LW frequencies can be assigned for a total of 24 different frequencies.

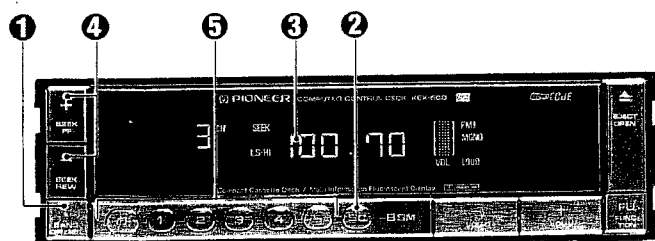
#### Note on LW Band Seek Tuning

The following shows changes in LW BAND broadcast frequency steps enacted by WARC/1979. The underlined italic figures indicate changes.

- Up to January 1986**  
155-164-173-182-191-200-209-218-227-236-245-254-263-272-281
- From February 1986**  
*153-162-171-180-189-200-209-218-227-236-245-254-263-272-281*
- From February 1988**  
153-162-171-180-189-*198-207-216-225-234*-245-254-263-272-281
- From February 1990**  
153-162-171-180-189-198-207-216-225-234-*243-252-261-270-279*

The LW BAND SEEK operations of this unit are performed in 9 kHz steps starting from 155 kHz. In the case of B, the change results in the first five frequencies being shifted (2 kHz each) from A, while the remaining ten are identical to those of A. Consequently, manual tuning (in 1 kHz steps) and seek tuning should be used together to tune in the desired LW broadcast. It is also suggested that your favorite LW stations will be memorized for instant recall.

### • KEX-500

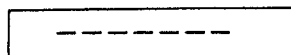


Frequently listened to frequencies can be assigned to preset buttons for later one-touch tuning. Frequencies can be assigned using either the best station memory function or seek/manual tuning.

#### Best Station Memory

The single touch of a button causes automatic tuning of strong broadcasts for assignment to preset buttons 0 through 5.

1. Press the band select button ① to select the desired band.
2. Press and hold down the best station memory button ② (for approximately two seconds) until the display ③ appears as illustrated below. The display flashes as illustrated to indicate that the memory function is being performed.



3. The frequency display returns once the best station memory function is complete. The frequency displayed at this time is the one assigned to preset button ① by the best station memory function.

#### Seek/Manual Tuning

1. Press the band select button ① to select FM1, FM2, FM3 or MW/LW.
  2. Press the (+) or (-) tuning button ④ to tune in the desired frequency.
  3. Press and hold down (for approximately two seconds) one of the preset buttons ⑤ until a beep sound is heard to indicate that assignment is complete. At this time the display ③ should show the number that corresponds to the preset button pressed.
  4. Frequencies can be assigned to the remaining preset buttons by repeating steps 2 and 3.
- 18 FM frequencies (6 for FM1, 6 for FM2, 6 for FM3) and 6 MW/LW frequencies can be assigned for a total of 24 different frequencies.

#### Note on LW Band Seek Tuning

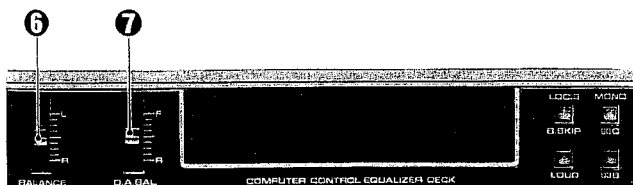
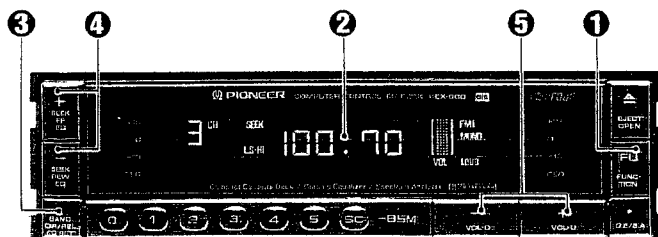
The following shows changes in LW BAND broadcast frequency steps enacted by WARC/1979. The underlined italic figures indicate changes.

- Up to January 1986**  
155-164-173-182-191-200-209-218-227-236-245-254-263-272-281
- From February 1986**  
*153-162-171-180-189-200-209-218-227-236-245-254-263-272-281*
- From February 1988**  
153-162-171-180-189-*198-207-216-225-234*-245-254-263-272-281
- From February 1990**  
153-162-171-180-189-198-207-216-225-234-*243-252-261-270-279*

The LW BAND SEEK operations of this unit are performed in 9 kHz steps starting from 155 kHz. In the case of B, the change results in the first five frequencies being shifted (2 kHz each) from A, while the remaining ten are identical to those of A. Consequently, manual tuning (in 1 kHz steps) and seek tuning should be used together to tune in the desired LW broadcast. It is also suggested that your favorite LW stations will be memorized for instant recall.

## 11. TUNING AN FM/MW/LW SECTION

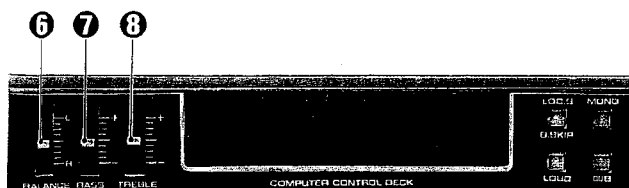
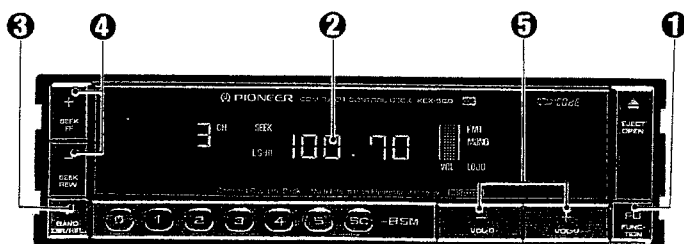
### • KEX-900



(Flip-Down Control Panel Section)

1. Press the mode button ① until the tuner indicator is shown on the display ②.
2. Press the band select button ③ to select the desired band.
3. Press the (+) or (-) tuning button ④. Pressing (+) tunes in the nearest higher receivable frequency, while pressing (-) tunes in the nearest lower receivable frequency (seek tuning).
4. Adjust the volume ⑤, balance ⑥, and dual amp balancer ⑦ (for 4-speaker systems) to the desired levels.

### • KEX-500



(Flip-Down Control Panel Section)

1. Press the mode button ① until the tuner indicator is shown on the display ②.
2. Press the band select button ③ to select the desired band.
3. Press the (+) or (-) tuning button ④. Pressing (+) tunes in the nearest higher receivable frequency, while pressing (-) tunes in the nearest lower receivable frequency (seek tuning).
4. Adjust volume ⑤, balance ⑥, bass ⑦, and treble ⑧ controls as you like.

- The unit is set for manual tuning when the seek indicator is not shown on the display ②. Simultaneously pressing the (+) and (-) tuning buttons ④ activates seek tuning (SEEK indicator appears on the display).

#### Manual Tuning

When manual tuning is selected, tuning can be performed in 50 kHz steps for FM, 9 kHz steps for MW, and 1 kHz steps for LW. Manual tuning is useful when tuning in frequencies unobtainable with seek tuning.

1. Simultaneously press the (+) and (-) tuning buttons ④ until the seek indicator disappears from the display ②.
2. Now pressing the (+) button increases the frequency, while pressing the (-) button decreases the frequency. Pressing and holding down either button causes high speed change of the frequency in the respective direction.
- Simultaneously press the (+) and (-) tuning buttons ④ until the seek indicator appears on the display to return to seek tuning.

- The unit is set for manual tuning when the seek indicator is not shown on the display ②. Simultaneously pressing the (+) and (-) tuning buttons ④ activates seek tuning (SEEK indicator appears on the display).

#### Manual Tuning

When manual tuning is selected, tuning can be performed in 50 kHz steps for FM, 9 kHz steps for MW, and 1 kHz steps for LW. Manual tuning is useful when tuning in frequencies unobtainable with seek tuning.

1. Simultaneously press the (+) and (-) tuning buttons ④ until the seek indicator disappears from the display ②.
2. Now pressing the (+) button increases the frequency, while pressing the (-) button decreases the frequency. Pressing and holding down either button causes high speed change of the frequency in the respective direction.
- Simultaneously press the (+) and (-) tuning buttons ④ until the seek indicator appears on the display to return to seek tuning.

### 13. CIRCUIT DESCRIPTION

- **Block Diagram (KEX-900)**

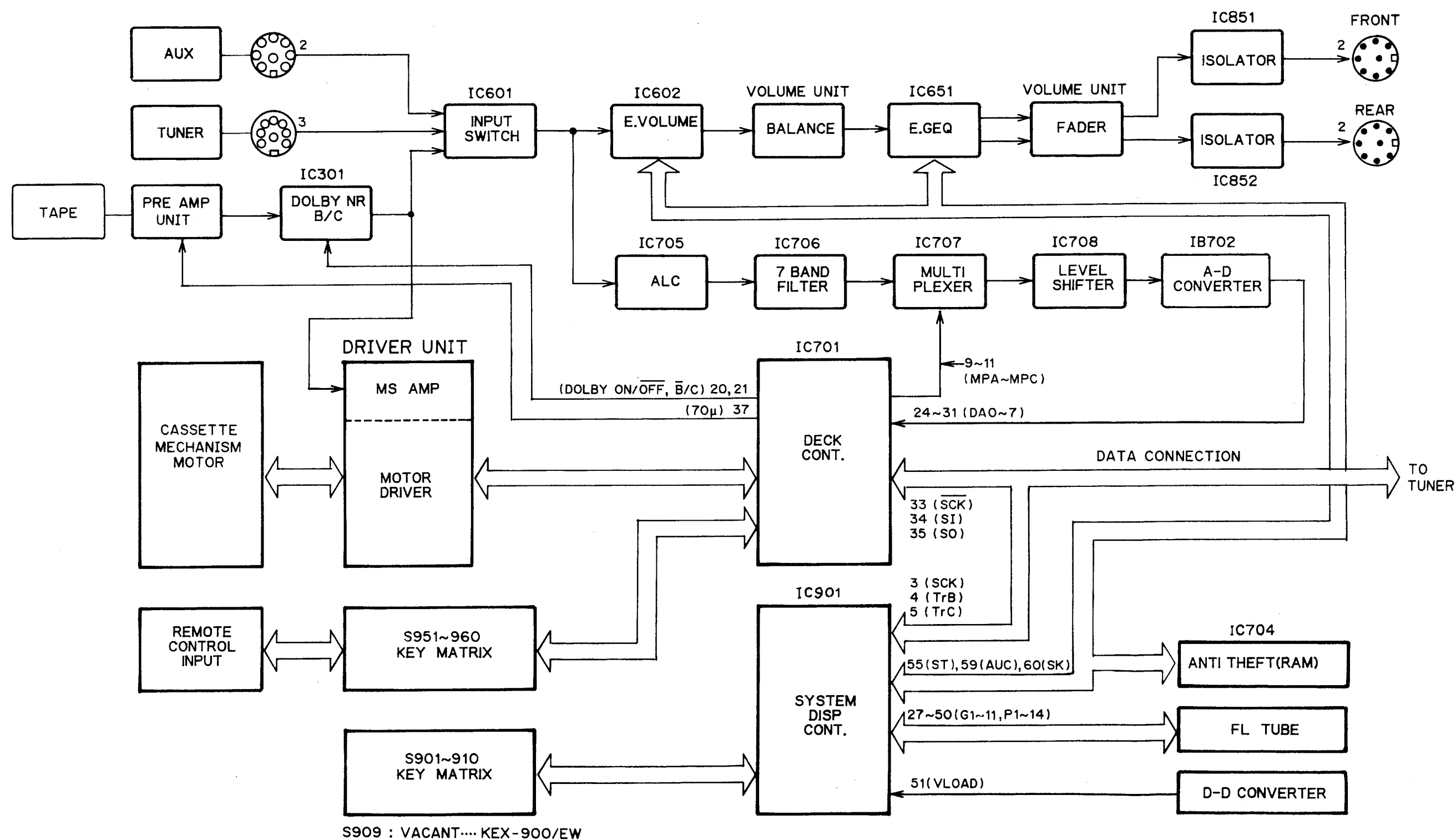


Fig. 1

● Block Diagram (KEX-500)

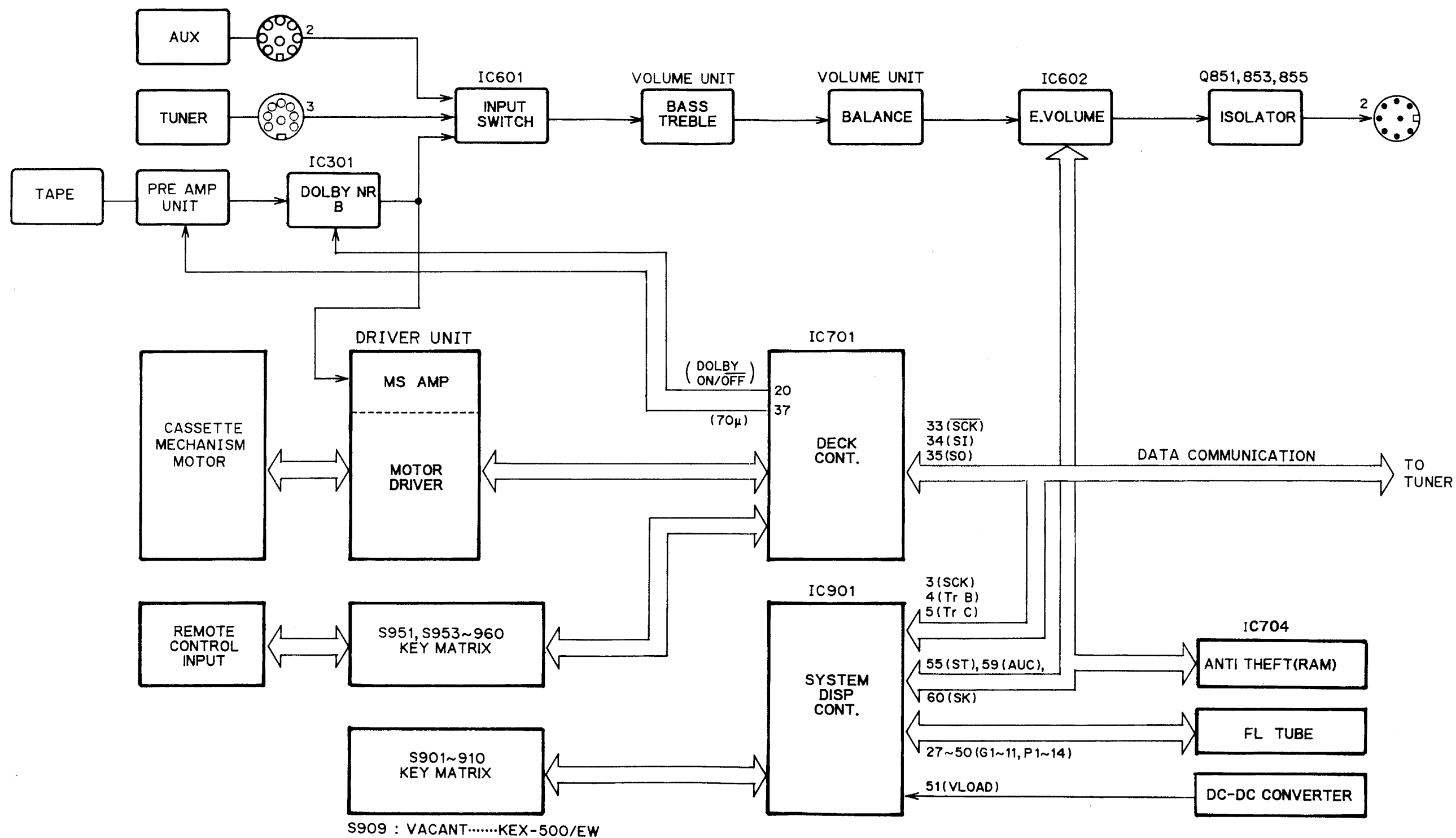


Fig. 1

● **+B Blcok Diagram (KEX-900)**

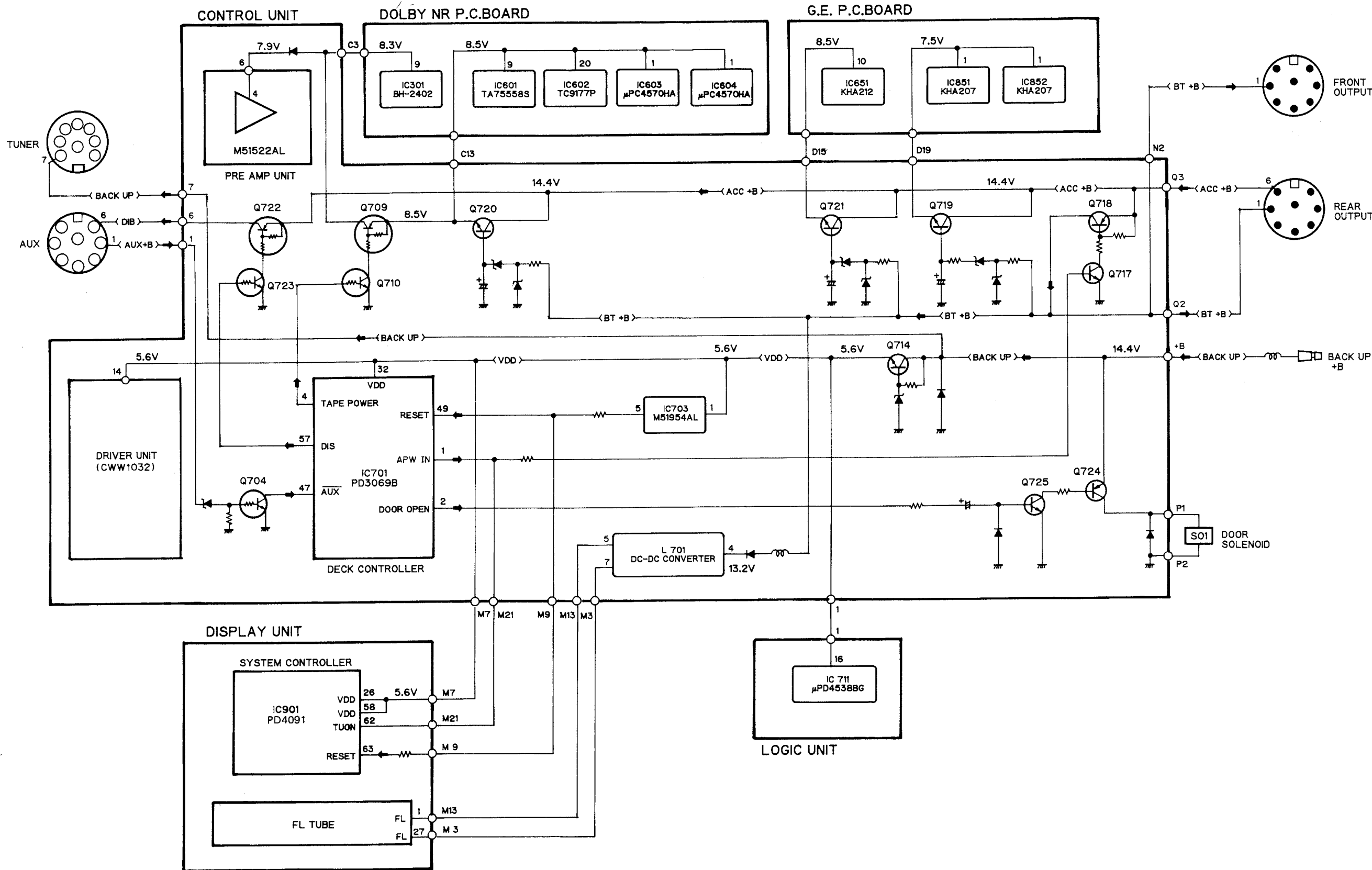


Fig. 3

• +B Block Diagram (KEX-500)

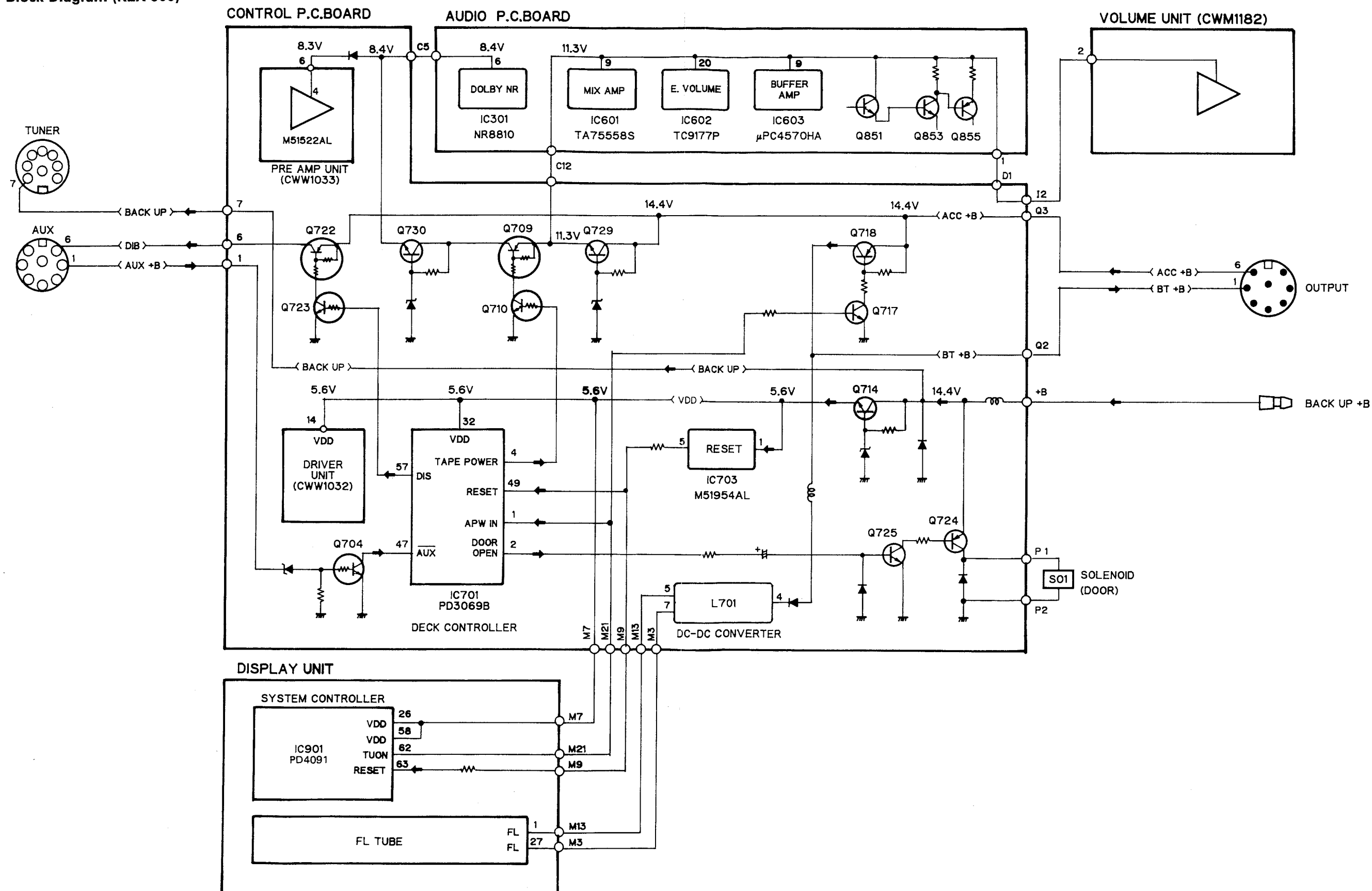


Fig. 4

● Level Diagram (KEX-900)

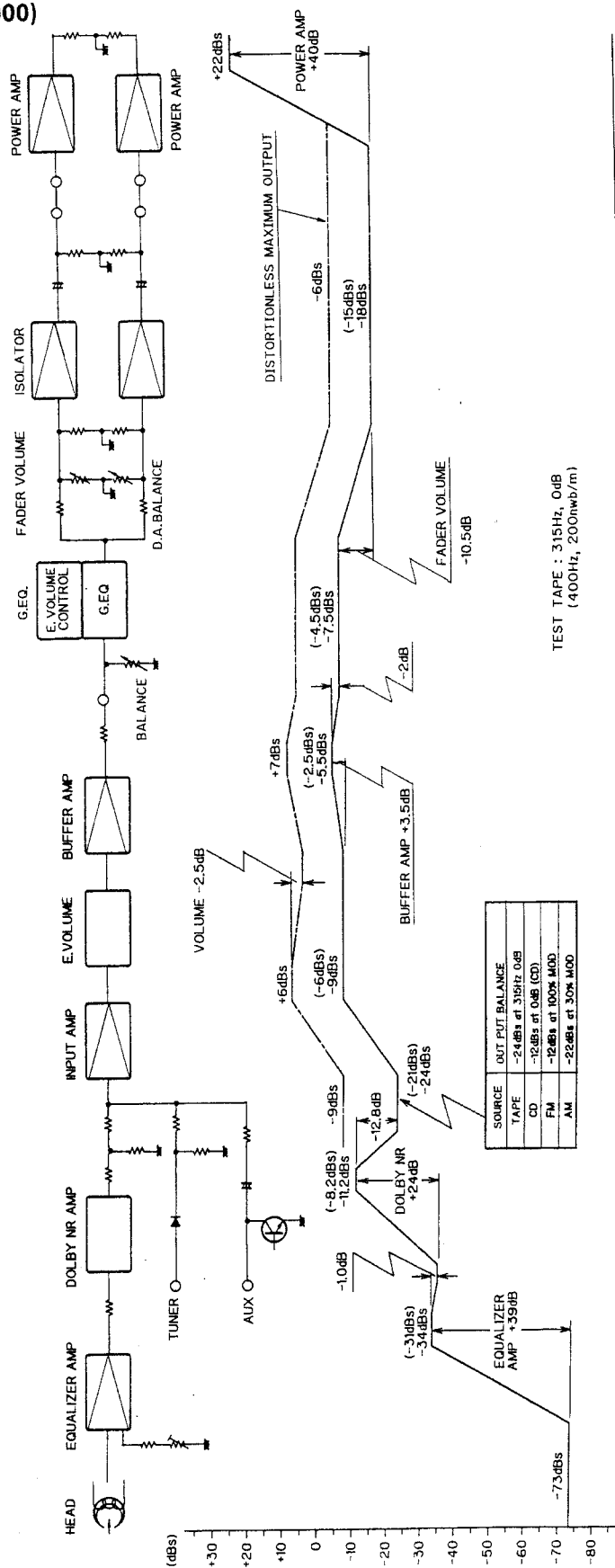


Fig. 5

## ● Level Diagram (KEX-500)

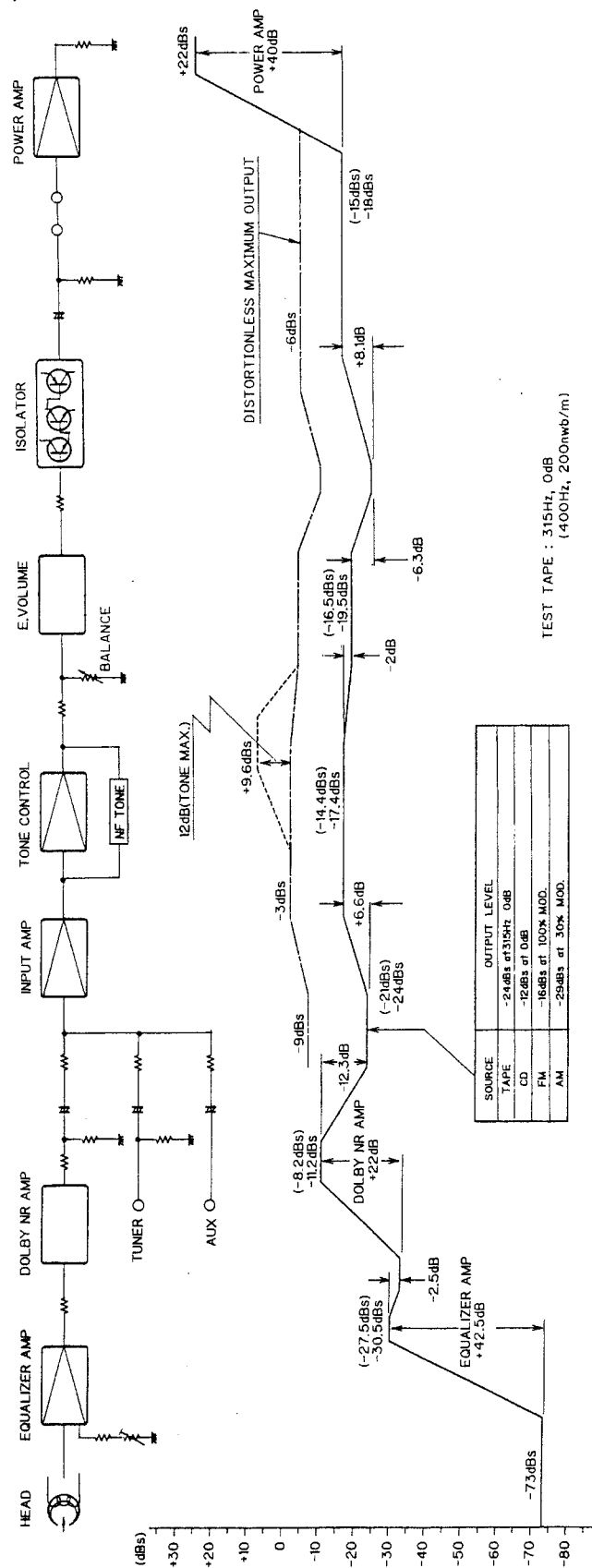


Fig. 6



# ● Electronic Volume (KEX-900)

## ○ Function of terminals (TC9177P)

*In the unit's circuitry, input and output of Lch and Rch are used in reverse.*

Terminal	Name	I/O	Function and operation
2, 3 19, 18	L-Loudness 1, 2 R-Loudness 1, 2	Output	Loudness terminal When loudness data is input, this terminal will be $-20$ dB tap terminal. Loudness is controlled by the high-low boost circuit connected to this terminal.
4 17	L-OUT1 R-OUT1	Output	10dB step attenuator output Signal with IN is attenuated from 0 to 70 dB in 8 steps at the 10 dB step.
5 16	L-IN1 R-IN1	Input	10 dB attenuator input
6, 15	A-GND		AC ground terminal
7 14	L-IN2 R-IN2	Input	2 dB attenuator input
8 13	L-OUT2 R-OUT2	Output	2 dB attenuator output Signal with IN is attenuated from 0 to 8 dB in 5 steps at the 2 dB step.
11	DATA	Input	Data input of attenuation amount and chnnel selection Consisting of 20 bits, it is input by the CK signal.
10	CK	Input	Clock input Clock input to fetch data of the DATA terminal.
12	ST	Input	Strobe input Attenuation amount and channel selection data fetched from the DATA and CK terminal can be latched by having this terminal set to "H" level. If "H" level is not applied to this terminal, the previous data will be in effect.
20	VDD		(+) power applied terminal
9	GND		Ground terminal
1	VSS		(-) power applied terminal

The TC9177P is a built-in electronic volume IC for loudness ON/OFF. The attenuation volume data output by the system controller (IC3), is input to the DATA, CK, and ST terminals. The data consists of 20 bits. It consists of the following.

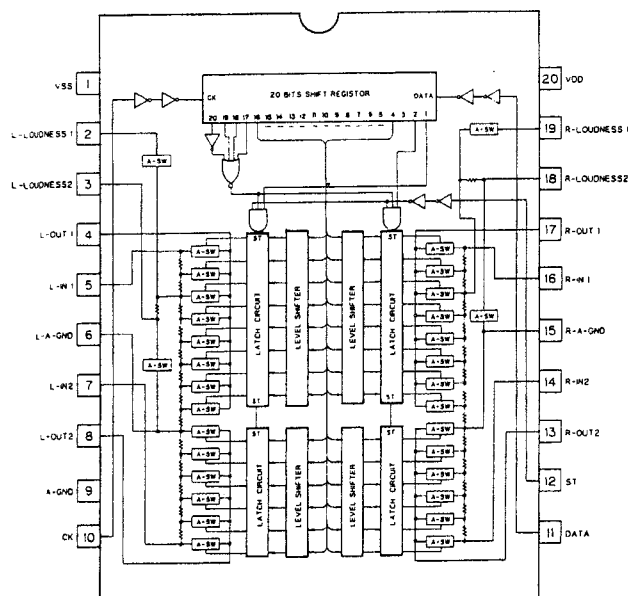


Fig. 7

Bit	Description
1, 2	Selection of L channel, R channel
3	Bit for loudness ON/OFF. "1" is ON, and "0" is OFF.
4 - 8	Setting of 2 dB step attenuator
9 - 16	Setting of 10 dB step attenuator
17 - 20	Chip select bit "0001" is select mode, for values other than this, there is no operation.

There will be infinite attenuation volume for  $-73$  dB data. Therefore, step up from infinity to 1 will be  $-76$  dB. Changes of the fetched data will all be synchronized with ST signal transition.

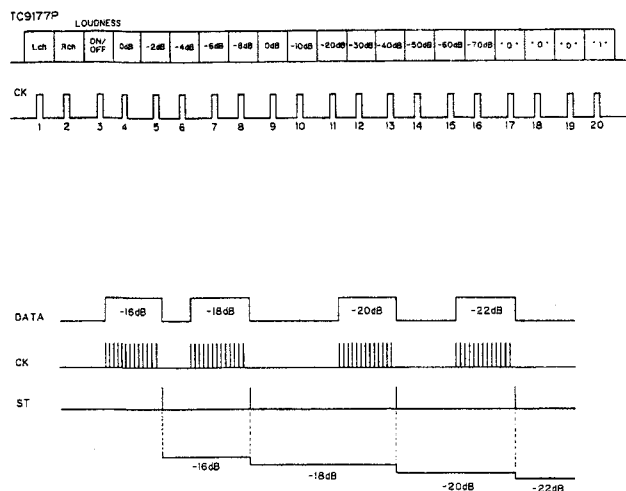


Fig. 8

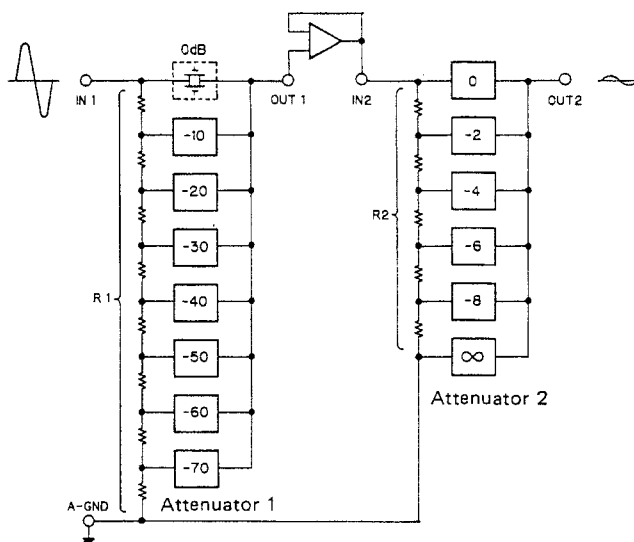


Fig. 9

## ○ Loudness function

The TC9177P has tap for loudness. When bit 3 of the data is made to "1," loudness switch LS1 will turn ON, LS2 will turn OFF, and the -20 dB tap is output to loudness-1 and loudness-2 terminals.

With the loudness-1 and loudness-2 terminals having a high-low band boost circuit, loudness can be controlled below -20 dB.

When bit 3 of the data is made to "0," loudness switch LS1 will go OFF, and LS2 will go ON. Loudness will go OFF without high-low band boost circuit operation.

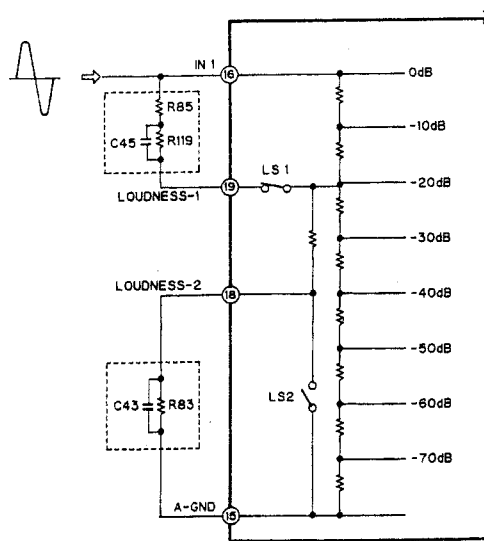


Fig. 10

● Spectrum Analyzer Circuit (KEX-900)

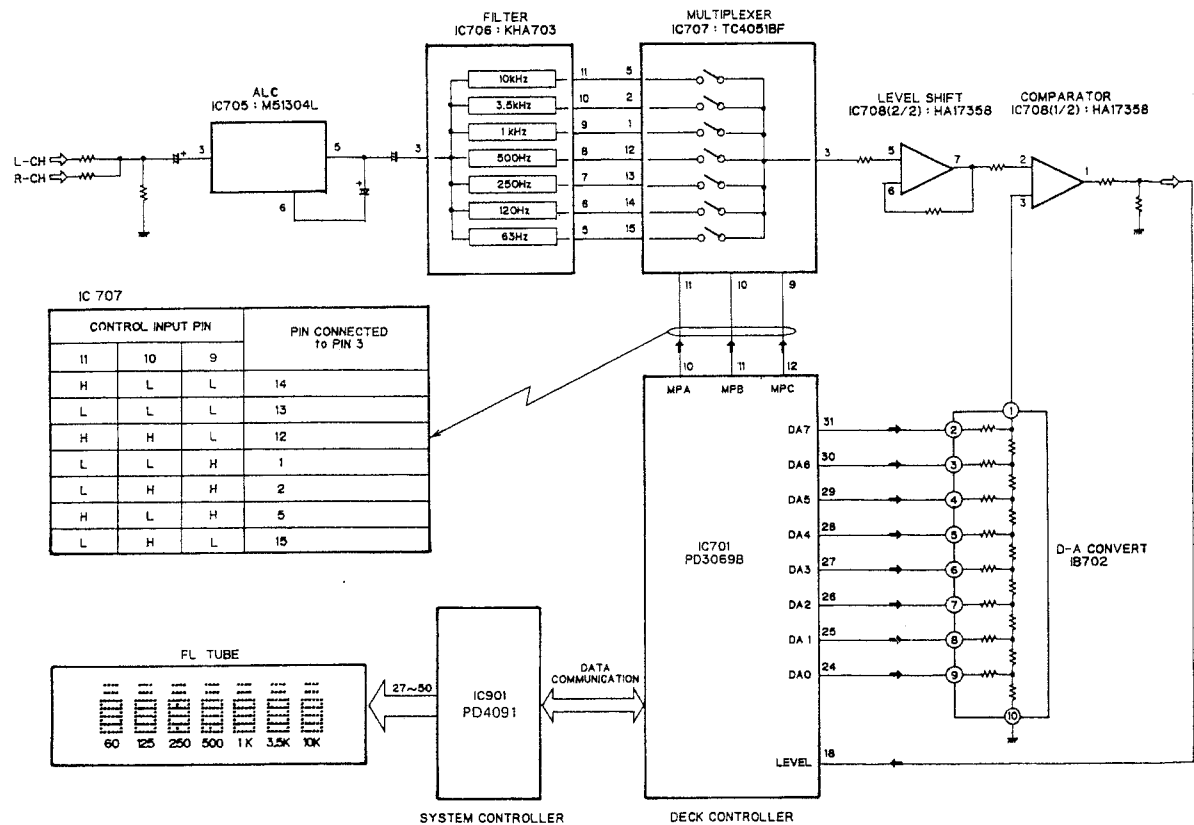


Fig. 11

Audio signals are divided into seven frequencies, and their power level is displayed sequentially.

The L and R output signals of the mixing amplifier (IC601) are combined and input to the ALC circuit (IC705). The audio signals, whose levels are adjusted by IC705, are separated into the following 7 frequencies via the IC706 band pass filter: 63 Hz, 120 Hz, 250 Hz, 500 Hz, 1 kHz, 3.5 kHz, and 10 kHz. It is further rectified into DC voltage by the IC's internal rectifier. Each signal is selected by the multiplexer (IC707) which is controlled by the deck controller (IC701). The signals will become 0 V to 4 V through the level shift circuit (IC708 2/2). These signals are input to pin 2 of the comparator circuit (IC708 1/2). Pin 3 is of standard voltage. The digital signals of pins 24 to 31 of the deck controller (IC701) add the voltage converted by IB702's D-A convertor circuit. The A-D converted signals converted by IC708 1/2 are input to the deck controller's pin 18. The power level of each frequency is then displayed on the FL tube.

The relation between the standard voltage of IC708's pin 3 and IC701's pins 24 to 31 is shown in Table 1.

IC701								IC708
24	25	26	27	28	29	30	31	3
DA0	DA1	DA2	DA3	DA4	DA5	DA6	DA7	
0	0	0	0	0	0	0	0	0.0 (V)
0	1	0	0	1	0	0	0	0.38
0	0	1	1	1	0	0	0	0.60
1	0	1	1	0	1	0	0	0.96
0	1	1	0	0	0	1	0	1.50
1	1	1	1	0	1	1	0	2.38
1	0	0	0	1	1	0	1	3.78

(V<sub>DD</sub> = 5.5V)

Table 1

## ● Graphic Equalizer Circuit (KEX-900)

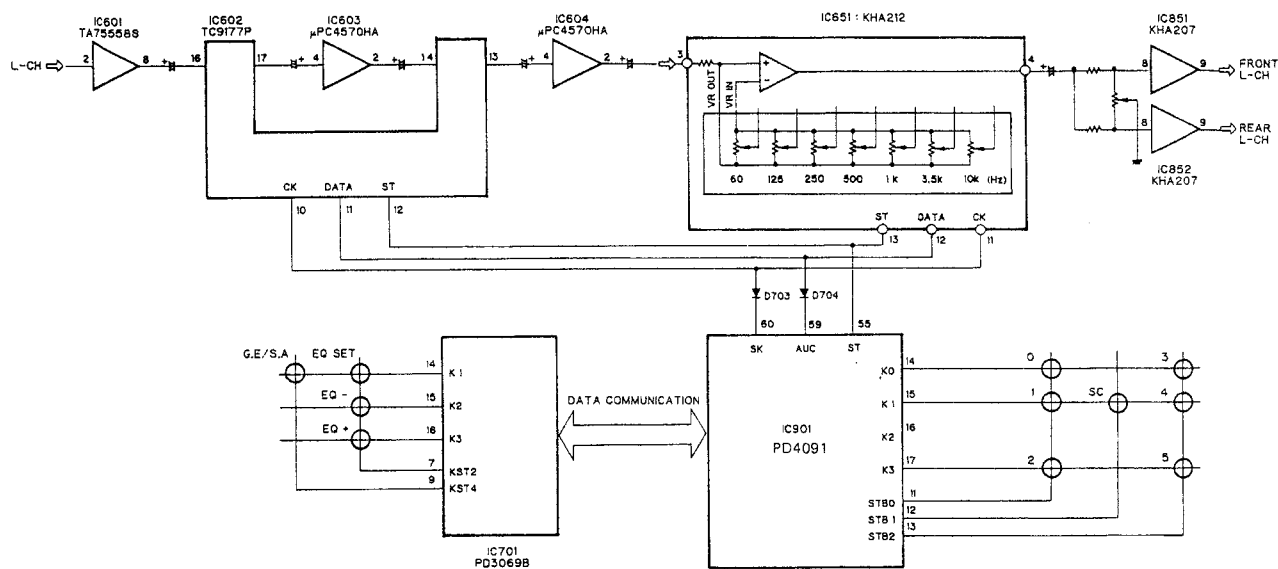


Fig. 12

The signals that have passed through electronic volume (IC602) pass through IC604 and are input to IC651's pin 3. As for IC651, the input signals are divided into separate frequencies, and each level is set by the electronic volume. The control of each level of the graphic equalizer is done by the data sent via serial transmission from the system controller (IC901).

The control signals output from IC901's pin 59 (AUC), pin 60 (SK), and pin 55 (ST) are input to IC651's pin 12 (DATA), pin 11 (CK), and pin 13 (ST).

1. The DATA line transmits the decreased amount composed of 12 bits and the volume select data.

### ● A1 to A4 (1 to 4 bits)

This bit selects one of the seven volume circuits, VR1 to VR7.

A1	A2	A3	A4	
H	L	L	H	VR1 (60Hz)
L	H	L	H	VR2 (125Hz)
H	H	L	H	VR3 (250Hz)
L	L	H	H	VR4 (500Hz)
H	L	H	H	VR5 (1kHz)
L	H	H	H	VR6 (3.5kHz)
H	H	H	H	VR7 (10kHz)

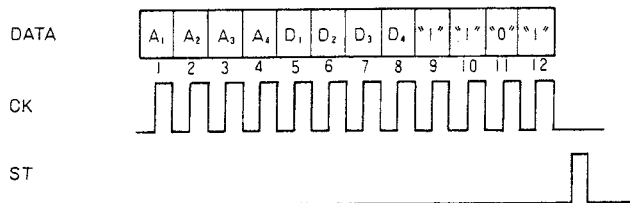


Fig. 13

- **D1 to D4 (5 to 8 bits)**

This data changes the volume selected by A1 to A4 in 13 steps.

D1	D2	D3	D4	Step
L	H	H	L	+ 6 (+ 12dB)
H	L	H	L	+ 5 (+ 10dB)
L	L	H	L	+ 4 (+ 8 dB)
H	H	L	L	+ 3 (+ 6 dB)
L	H	L	L	+ 2 (+ 4 dB)
H	L	L	L	+ 1 (+ 2 dB)
L	L	L	L	0 ( 0 dB)
H	H	H	H	- 1 (- 2 dB)
L	H	H	H	- 2 (- 4 dB)
H	L	H	H	- 3 (- 6 dB)
L	L	H	H	- 4 (- 8 dB)
H	H	L	H	- 5 (- 10dB)
L	H	L	H	- 6 (- 12dB)

- **Code bit (9 to 12 bits)**

Data cannot be received by codes other than IC651's code bit.

9	10	11	12
H	H	L	H

2. The CK line is the clock signal.

3. When the ST line becomes "H" by the strobe signal, it latches the volume data.

The signals set up for each level of IC651 are input to IC851.

- **Location of Major Parts**

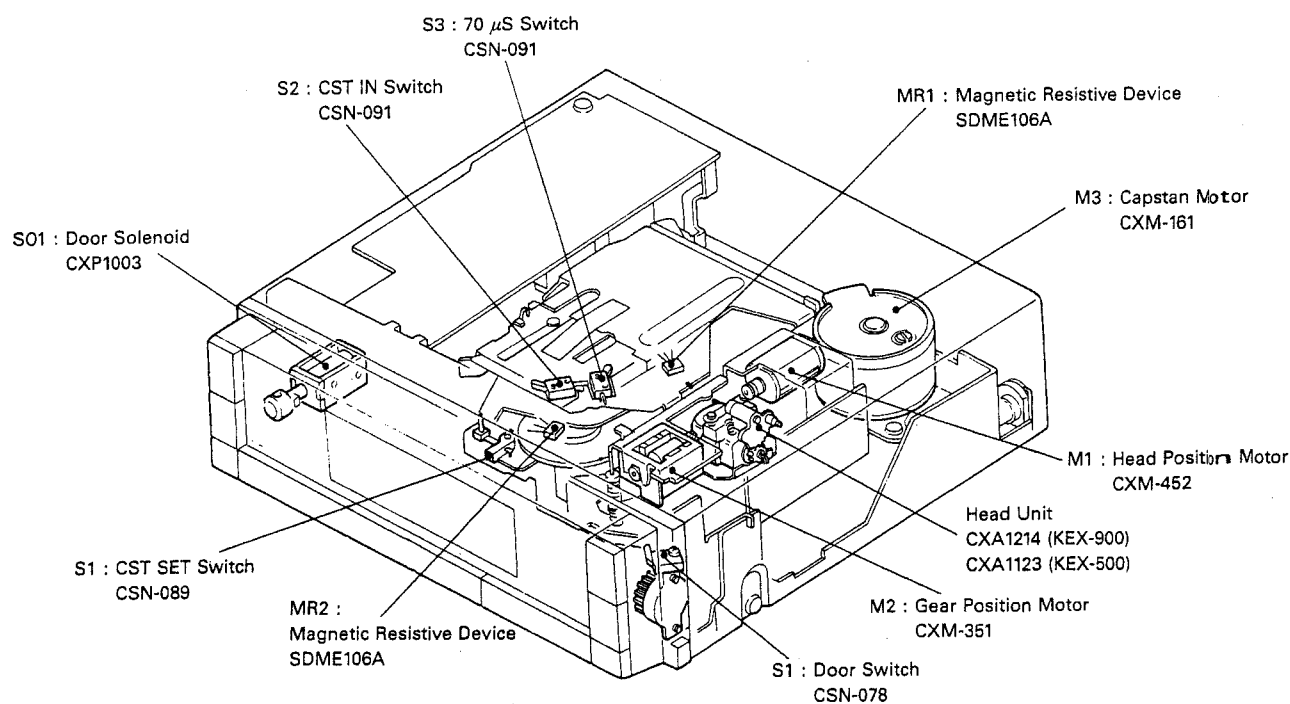


Fig. 14

## o Sensing switches

### Cassette Position

Switch	Function
CST IN switch	Turned OFF when a cassette tape is inserted.
CST SET switch	Turned ON when the cassette tape is set in position.
70 $\mu$ s switch	Turned OFF when a 70 $\mu$ s cassette tape is inserted.

### Head Position (Switch Position) . . . . . Sense P.C. Board (A)

Position	Mechanism operation
FP	FWD PLAY
MS	MS
EJ	Eject
RP	REV PLAY

### FF/REW Gear Position (Switch Position) . . . . . Sense P.C. Board (B)

Position	Mechanism operation
L	FF in FWD (normal) and REW in REV
C	Eject or play
R	REW in FWD (normal) and FF in REV

## ● Control Mode and Operation of Mechanism

Control mode		Control code IC701 (PD3069B)			Mechanism operation	Output terminal voltage Driver Unit (PA3019)					
		I0 (44)	I1 (43)	I2 (42)		CMH (19)	CMR (20)	CMG (21)	M 1 (15)	MC (16)	M 2 (17)
Output OFF		0	0	0	Release	Z	Z	Z	Z	Z	Z
M 3 (CM)	Normal	1	0	0	Loading	HC	L	↑	↑	↑	↑
	Reverse	0	1	0	Eject	L	HC	↑	↑	↑	↑
	Constant speed	1	1	0	PLAY, FF, REW or MS	HO	Z	L	↑	↑	↑
M1	Normal	0	0	1	Head EJ → FP	↑	↑	↑	HC	L	↑
	Reverse	1	0	1	Head EJ → RP	↑	↑	↑	L	HC	↑
M2	Normal	0	1	1	Gear direction: R → L	↑	↑	↑	Z	L	HC
	Reverse	1	1	1	Gear direction: L → R	↑	↑	↑	↑	HC	L

Notes: 1) Numbers in parentheses indicate pin numbers of each IC.

2) Output terminal voltage

Z: High impedance

HC: Approximately 7V

HO: Vcc - 1.7V

L: 0V

● KEX-900

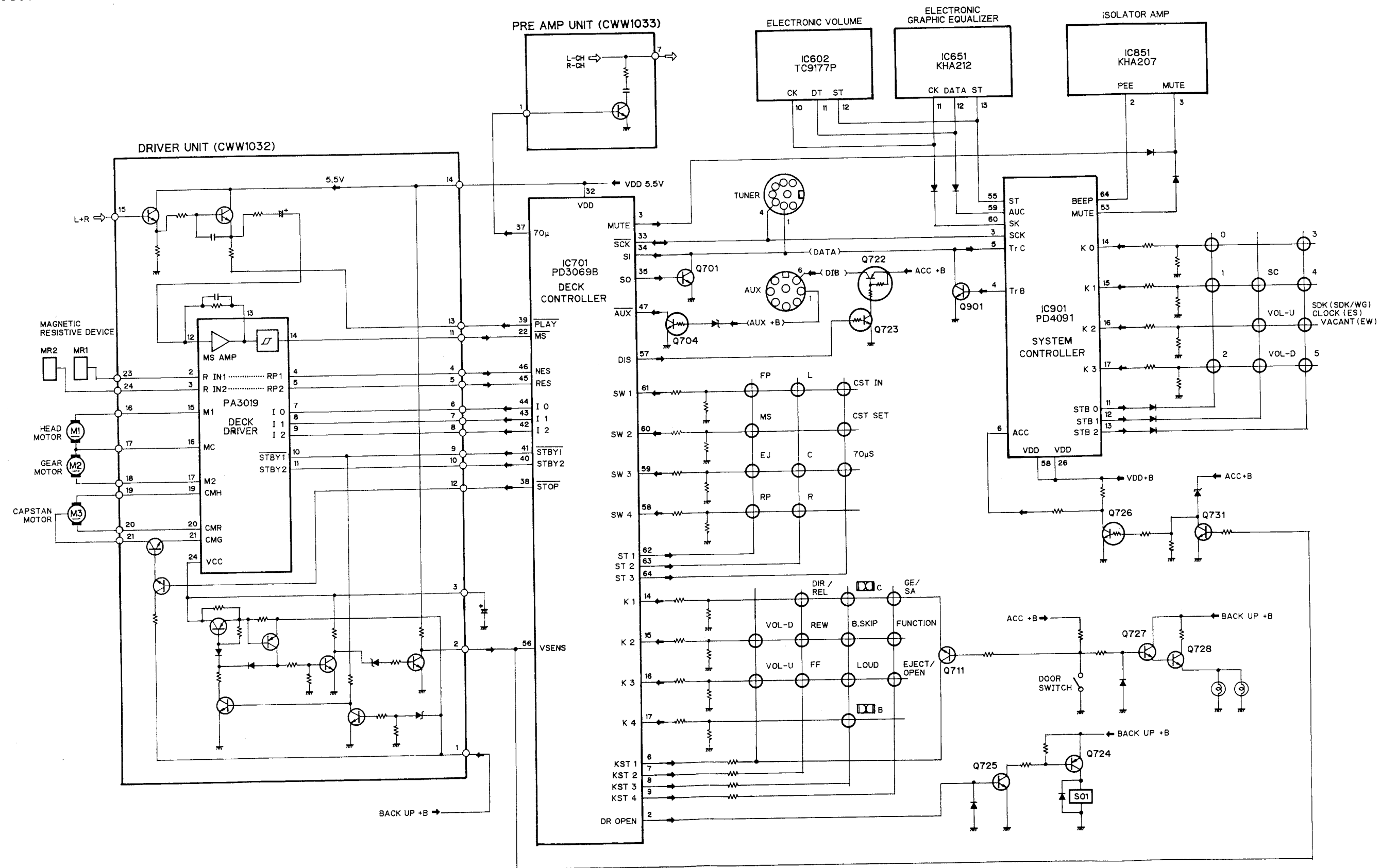


Fig. 15

• KEX-500

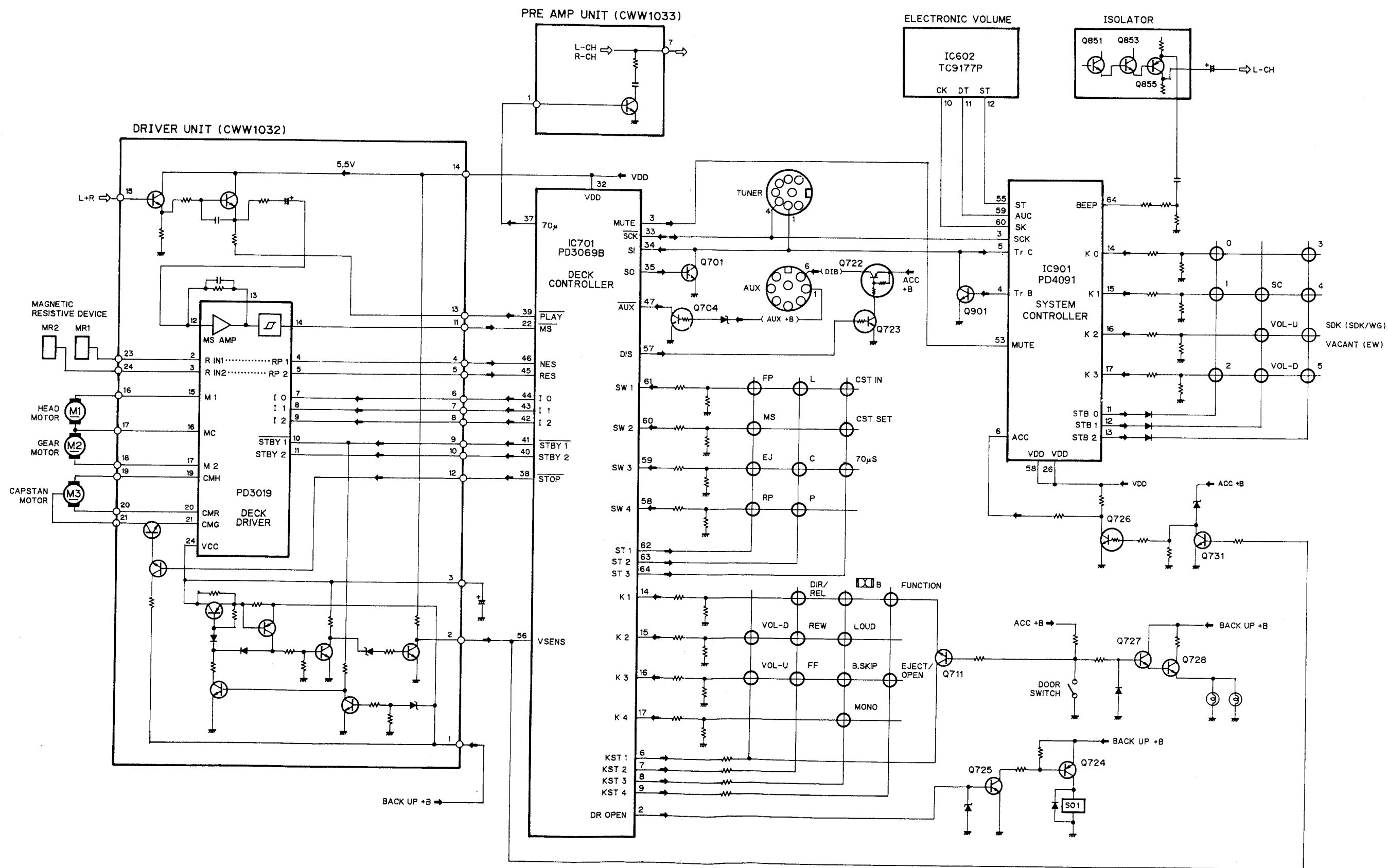


Fig. 15



# Service Manual

## REPAIR & ADJUSTMENTS



The photo shows the model KEX-900/ES.

ORDER NO.  
CRT 1074

CENTRATE COMPONENT CAR STEREO  
EQUALIZER DECK

# KEX-900 ES, EW

# KEX-900SDK WG

- For the circuit descriptions, please refer to the KEX-900 service manual (CRT1076).

**Note:**

- See the separate manual CRT-467 for the cassette mechanism description.

## SPECIFICATIONS

### General/Equalizer

Power source .....	14.4 V DC (10.8 — 15.6 V allowable)
Grounding system .....	Negative type
Dimensions .....	180 (W) × 50 (H) × 163 (D) mm
Weight .....	1.5 kg
Equalization frequency .....	10 kHz, 3.5 kHz, 1 kHz, 500 Hz 250 Hz, 125 Hz, 60 Hz
Equalization range .....	±15 dB (125 Hz, 60 Hz) ±12 dB (10 kHz, 3.5 kHz, 1 kHz, 500 Hz, 250 Hz)
Loudness contour .....	+10 dB (100 Hz), +7dB (10kHz) (volume: -30 dB)
Maximum output level .....	200 mV
Output impedance .....	1 kΩ

### Tape player

Tape .....	Compact cassette tape (C-30 — C-90)
Tape speed .....	4.76 cm/sec. (+0.14 cm/sec., -0.05 cm/sec.)
Fast forward/rewind time .....	Approx. 100 sec. for C-60
Wow & flutter .....	0.09 % (WRMS)
Frequency response .....	Metal: 30 — 20,000 Hz (±3 dB) Normal: 30 — 17,000 Hz (±3 dB)
Stereo separation .....	45 dB
Signal-to-noise ratio .....	Dolby C-type NR IN: 70 dB (IEC-A network) Dolby B-type NR IN: 63 dB (IEC-A network) Dolby NR OUT: 55 dB (IEC-A network)

**Note:**

Specifications and the design are subject to possible modification without notice due to improvements.

- Dolby and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.
- Noise Reduction System manufactured under license from Dolby Laboratories Licensing Corporation.

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 TEL: (03) 580-9811

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## 1. PARTS LOCATION

### NOTE:

- For your parts Stock Control, the fast moving items are indicated with the marks \*\* and \*.
- \*\*: GENERALLY MOVES FASTER THAN \*.
- This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- Parts marked by "●" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

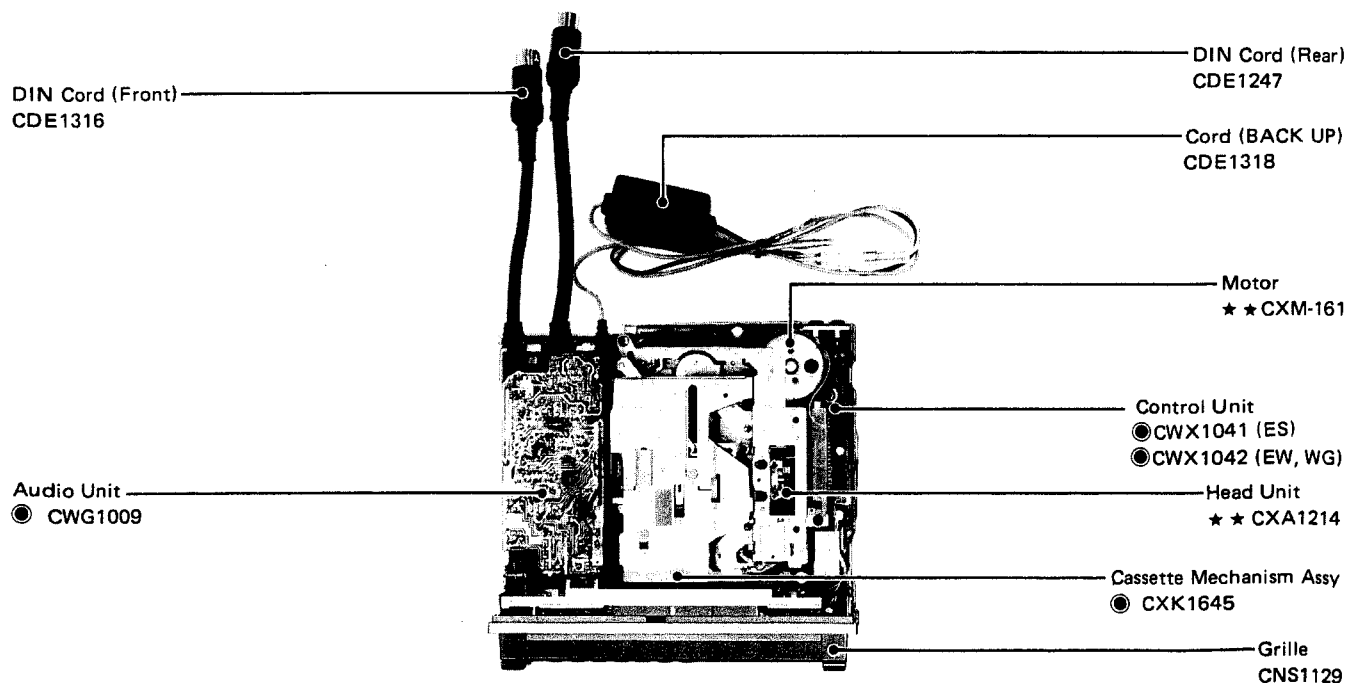


Fig. 1

## 2. DISASSEMBLY

### ● Case Removal (Fig. 2)

1. Remove 4 screws, then remove the case unit.

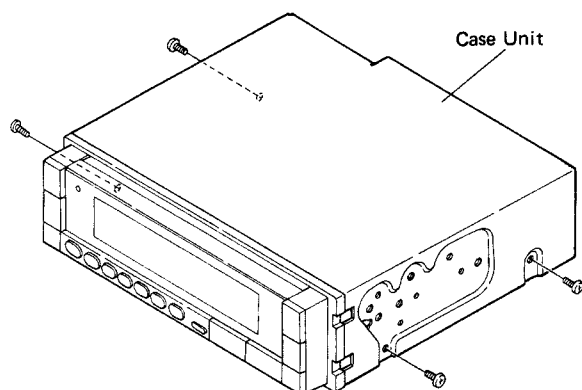


Fig. 2

### ● Removal of Cassette Mechanism Assy (Fig. 3)

1. Remove 4 screws, disconnect the connector, then remove the cassette mechanism assy.

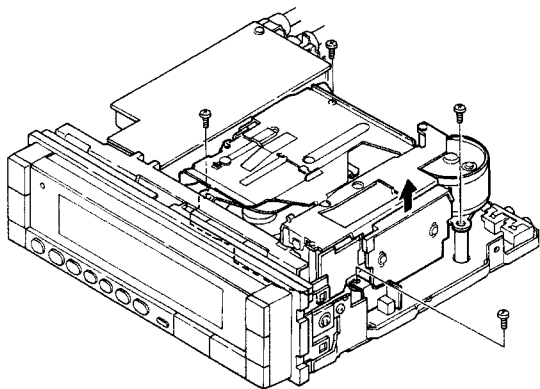


Fig. 3

### ● Removal of Dolby NR P. C. Board (Fig. 4)

1. Remove 1 "B" screw.
2. The Dolby NR p. c. board is connected to the control unit by the connector indicated by the arrow, so remove the board by lifting it upward.

### ● Chassis Removal (Fig. 4)

1. Remove 3 "A" screws, then remove the chassis unit.

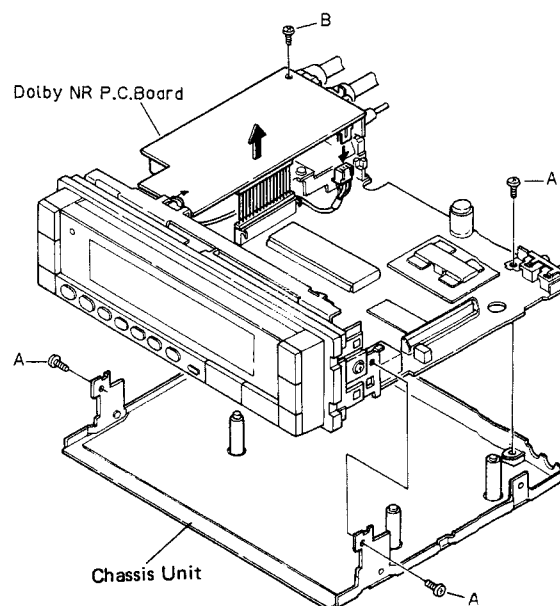


Fig. 4

### ● Grille Assy Removal (Fig. 5)

1. Remove 2 screws and the soldering indicated by the arrow.
2. Remove the connector indicated by the arrow, then remove the grille assy.

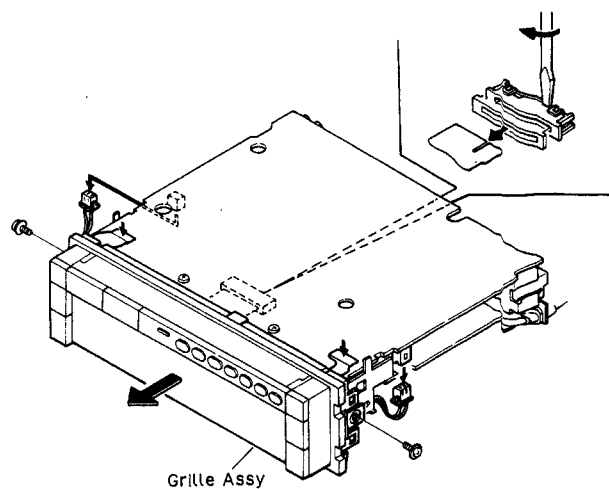


Fig. 5

## ● Removal of Right Switch (R. SW) Unit (Fig. 6)

1. Remove 2 screws, then remove the damper unit.
2. Remove 2 screws, then remove the right switch unit.

## ● Removal of Left Switch (L. SW) Unit (Fig. 6)

1. Remove 2 screws, then remove the solenoid unit.
2. Remove 2 screws, then remove the left switch unit.

## ● Removal of Display Unit

1. Remove 1 screw, then remove the holder.
2. Remove the display unit.

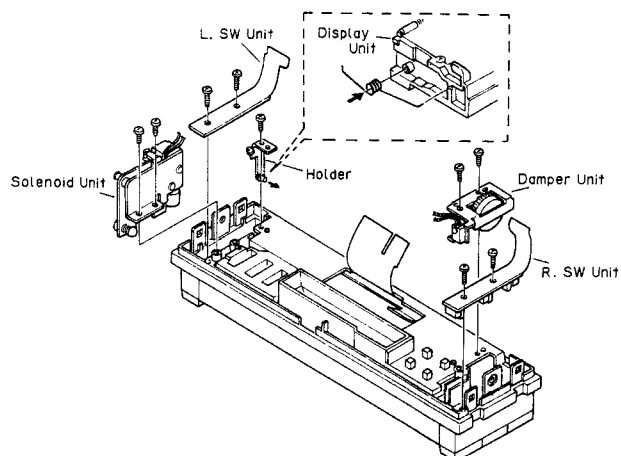


Fig. 6

## ● Removal of Display P.C. Board (Fig. 7)

1. Remove 2 "C" screws, then remove the plate unit.
2. Remove 1 "D" screw and 3 "E" screws, then remove the display p.c. board.

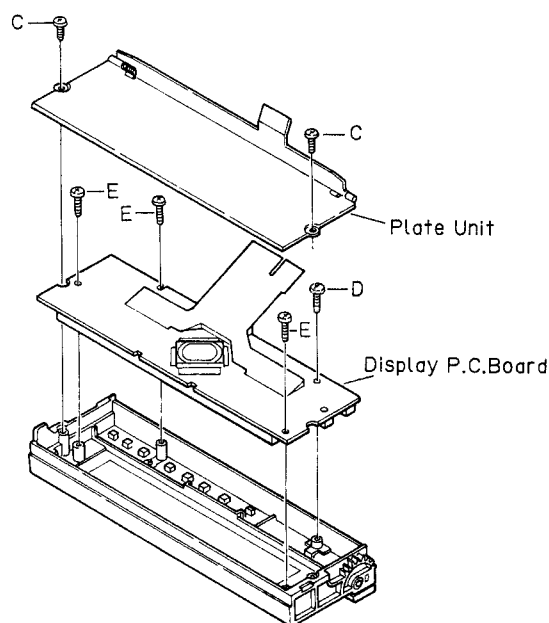


Fig. 7

## 3. ADJUSTMENT

### 3.1 AZIMUTH ADJUSTMENT

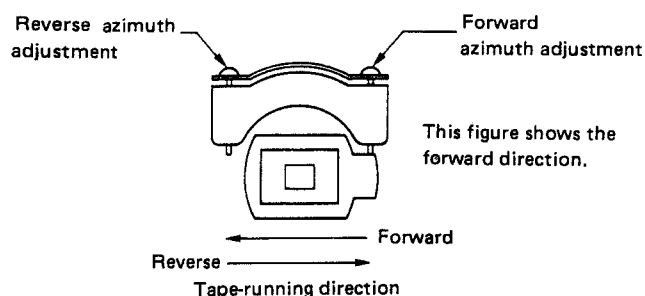


Fig. 8

### 3.2 TAPE SPEED ADJUSTMENT

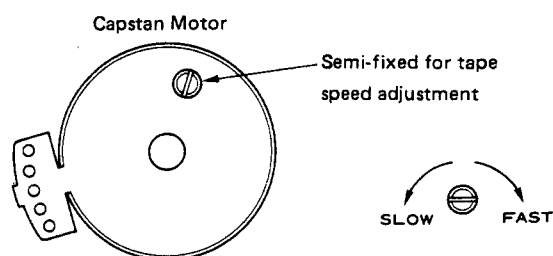


Fig. 9

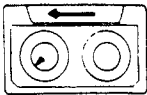

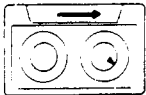
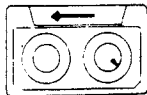
## ● Adjustment Procedure

1. Play back Side A of STD-341A (10kHz, -20dB), and adjust the respective adjusting screws for maximum output in the forward and reverse directions.
2. Play back Side B in the forward and reverse directions, then confirm the respective output.

## ● Adjustment Procedure

1. Play back STD-301 (3kHz, -10dB), then adjust the semifixed resistor so that the value of the frequency counter display is within 3,010Hz  $\pm$  30Hz.

## 3.3 CHECK POINTS OF CASSETTE MECHANISM

<p>Confirm the following items when replacing parts of the cassette mechanism.</p>	<p>■ Tape speed deviation:</p> $3,000 \pm \frac{90}{30} \text{ Hz}$ $(4.76 \text{ cm/s} \pm \frac{3}{1} \%)$ <p>Using an STD-301, measure the speed at the start and end of winding and see that a deviation remains within the limits each time. If values indicated by the pointer vary considerably, adjust to 70% of the minimum and maximum values. Measuring time shall be 5~6 seconds.</p>	<p>■ Wow and flutter:</p> <p>Less than 0.15% (WRMS)</p> <p>Using an STD-301, measure the wow and flutter at the start and end of winding and take the maximum value. If values indicated by the pointer vary considerably, adjust to 70% of the minimum and maximum values. Measuring time shall be 5~6 seconds.</p>
<p>■ Fast forward and rewinding time:</p> <p>95 ~ 115 seconds</p> <p>Using a C-60, set to fast forward and re-wind, and measure the time with a stop watch.</p>	<p>■ Winding torque:</p> $37 \sim 63 \text{ g} \cdot \text{cm}$  <p>Using a cassette type torque meter (100 g·cm), measure the minimum value while in the play mode. Measuring time shall be 5 ~ 6 seconds.</p>	<p>■ F.F. torque:</p> $67 \sim 130 \text{ g} \cdot \text{cm}$  <p>Using a cassette type torque meter (120 g·cm), measure the value when the tape stops in the F.F. mode.</p>
<p>■ REW torque:</p> $67 \sim 130 \text{ g} \cdot \text{cm}$  <p>Using a cassette type torque meter (120 g·cm), measure the value when the tape stops in the REW mode.</p>	<p>■ Back tension torque:</p> $1.8 \sim 4.2 \text{ g} \cdot \text{cm}$  <p>After setting in the REW mode without loading a cassette tape for 5 minutes, measure the back tension torque in the play mode, using a cassette type torque meter.</p>	<p>■ Cassette loading force:</p> $450 \sim 550 \text{ g}$ <p>Push the center of the cassette and measure the force with a tension meter (1 kg).</p>

### 3.4 CLOCK FREQUENCY ADJUSTMENT (ES)

#### ● Connection Diagram

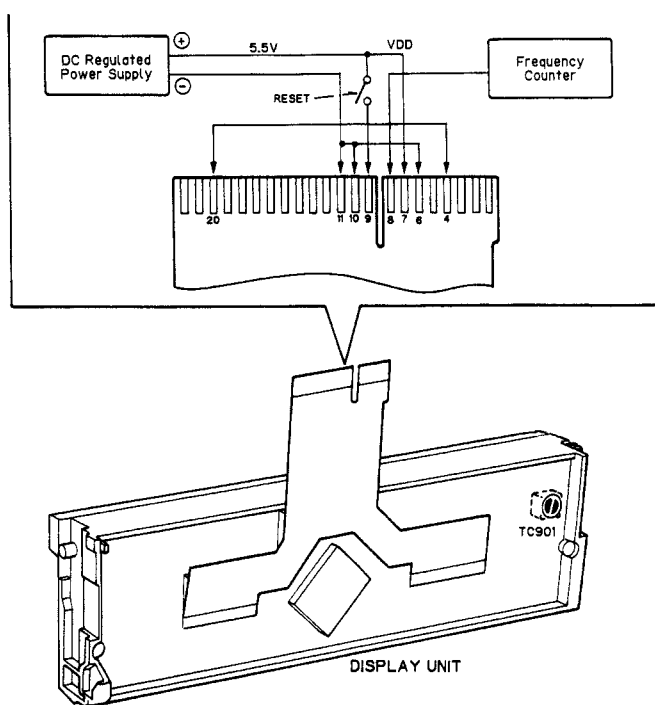


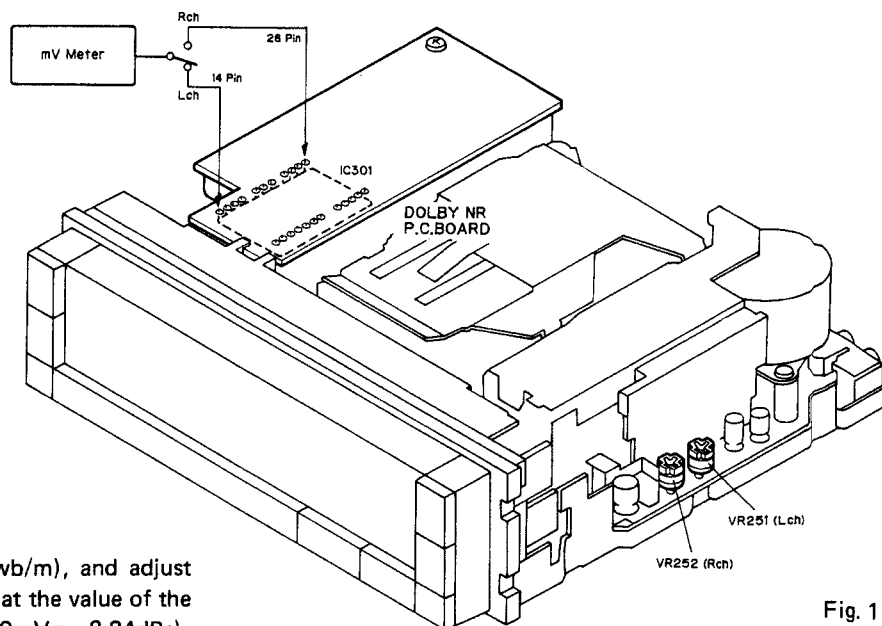
Fig. 10

#### ● To Adjust

1. Remove the display unit. Because the display unit is connected as shown in the Fig. 10, set the RESET switch to ON to reset the display unit.
2. Adjust TC901 so that the value of the frequency counter display is within  $131.072\text{kHz} \pm 1\text{Hz}$ .

### 3.5 DOLBY NR LEVEL ADJUSTMENT

#### ● Connection Diagram

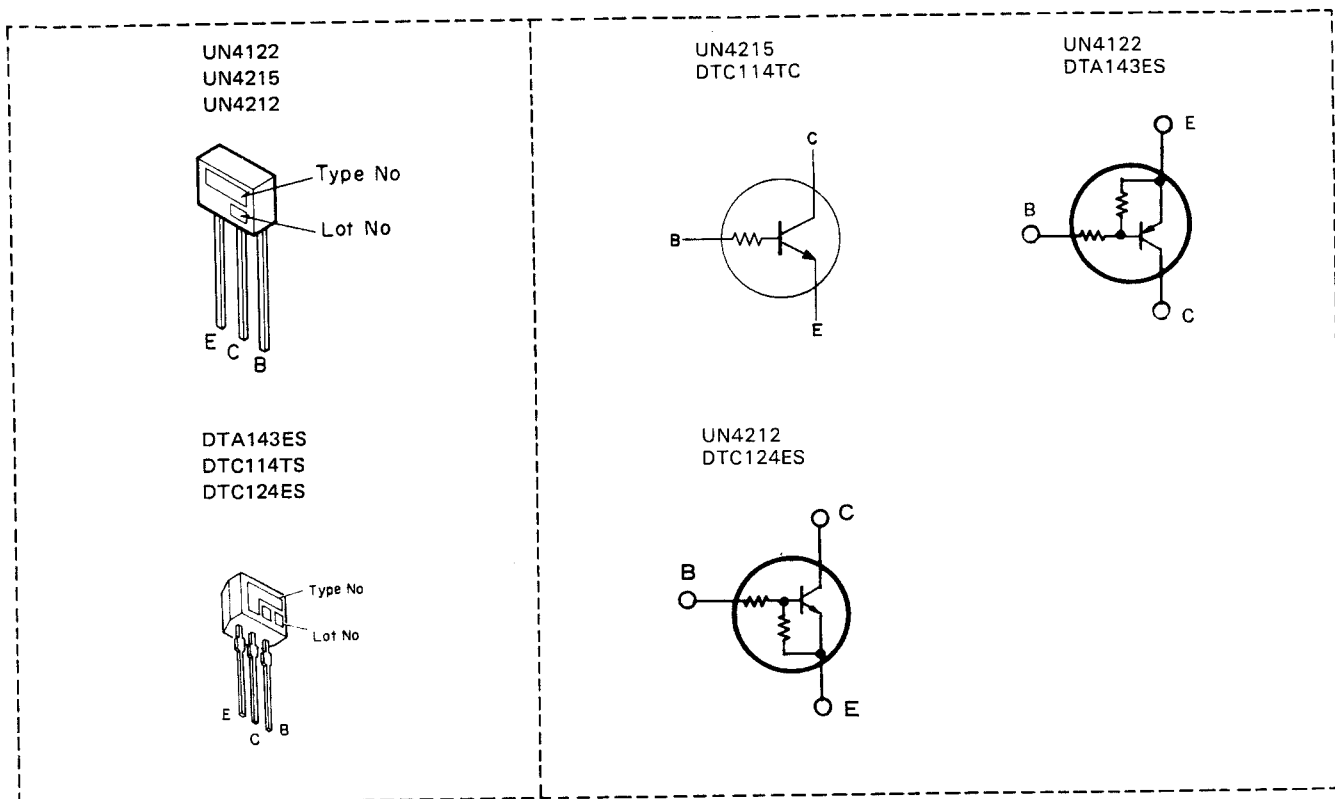


#### ● To Adjust

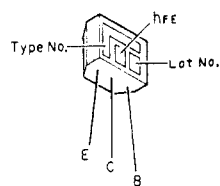
1. Set the DOLBY NR switch to OFF.
2. Play back NCT-150 (400 Hz, 200 nwb/m), and adjust VR251 (L ch) and VR252 (R ch) so that the value of the mV meter is within  $300\text{mV} \pm 1\text{dB}$ . ( $300\text{mV} = -8.24\text{dBs}$ )

Fig. 11

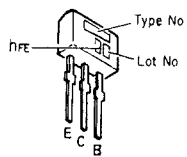
• ICs and Transistors



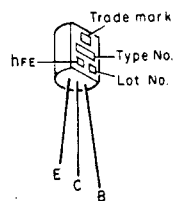
2SA933S  
2SC2872S



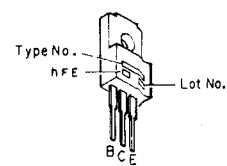
2SD1227M



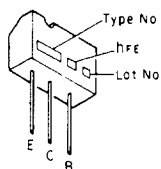
2SC2634NC



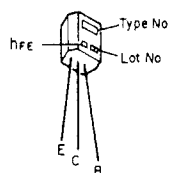
2SB94-5



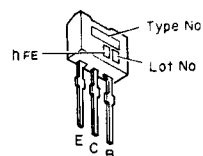
2SD1055F



2SA1048  
2SC1740S  
2SC2458  
2SC2458L  
2SC3113

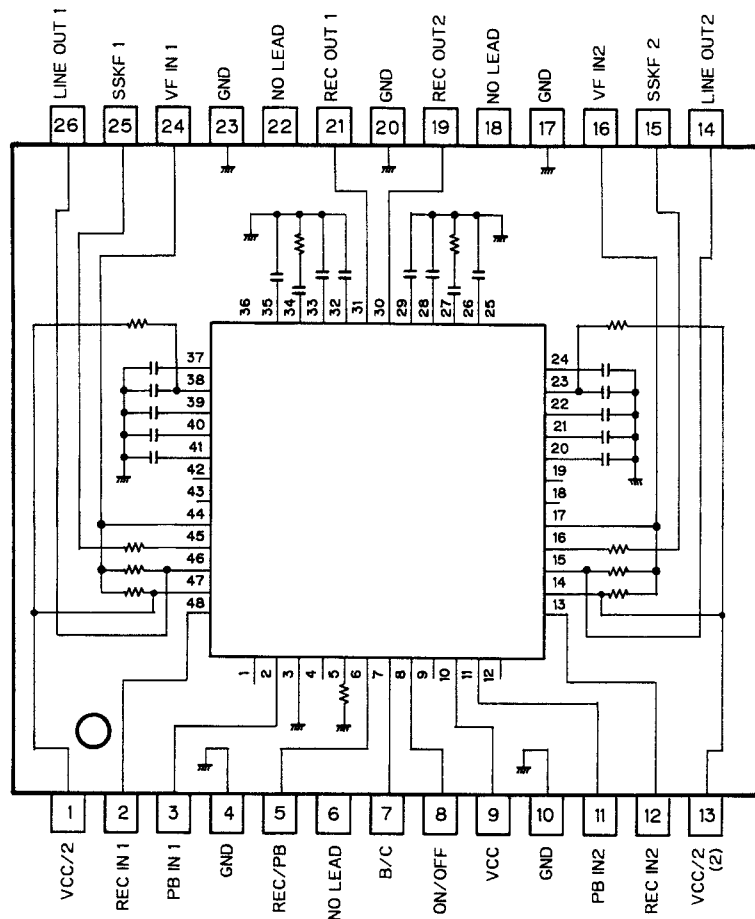


2SB1066M

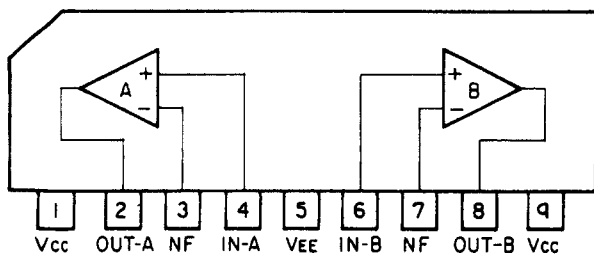


## ● Dolby NR P.C. Board

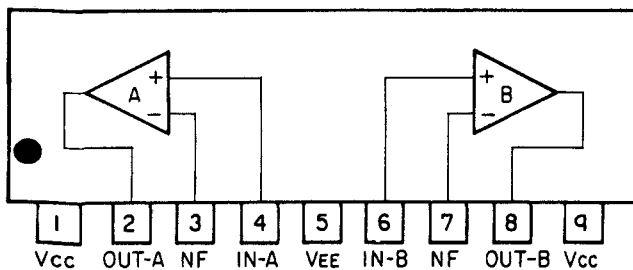
IC301: BH-2402



IC601: TA75558S

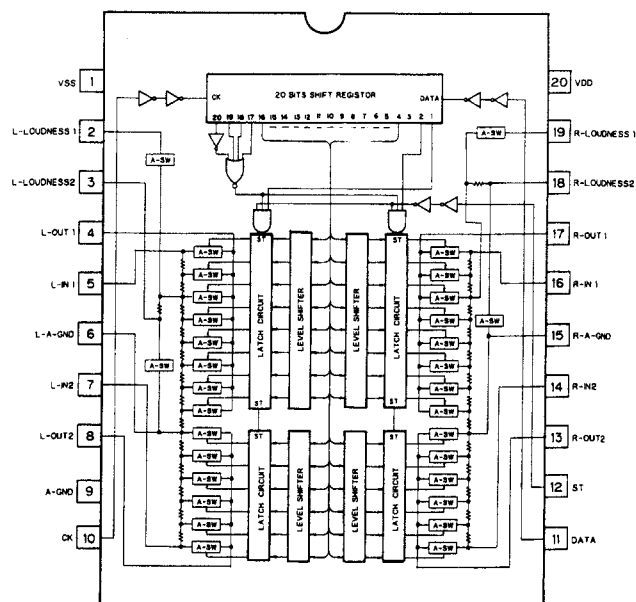


IC603, 604:  $\mu$ PC4570HA



IC602: TC9177P

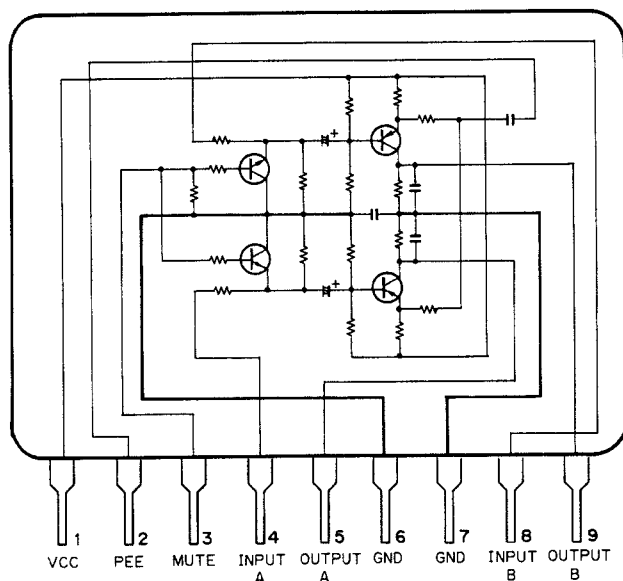
Due to the circuit configuration of KEX-900, Lch and Rch of input and output are used in reverse position.



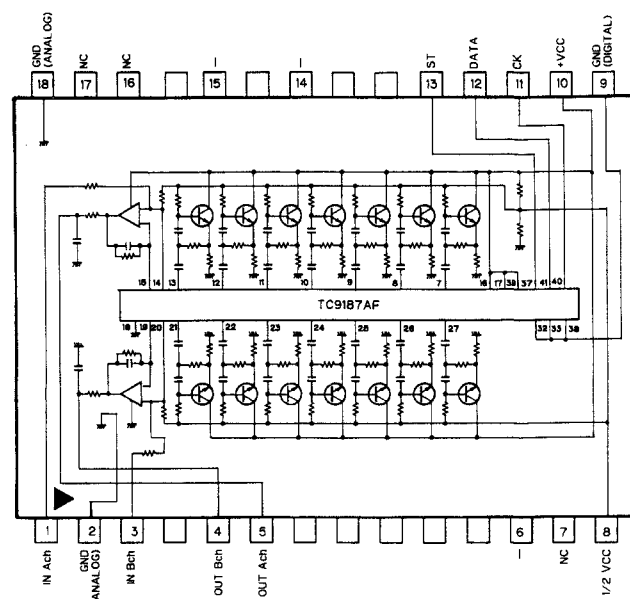


• G.E. P.C. Board

IC851, 852: KHA207

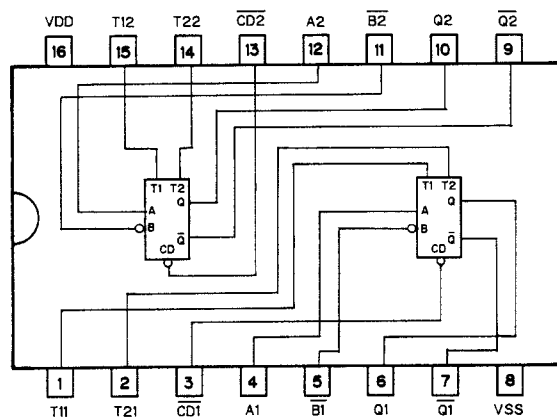


IC651: KHA212



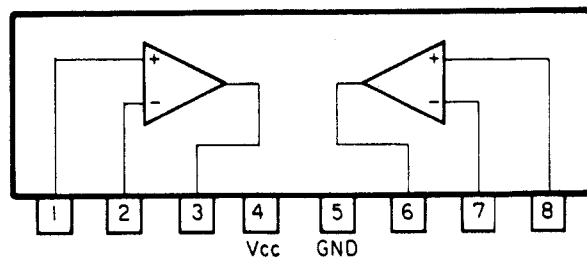
• Logic Unit

IC711:  $\mu$ PD4538BG

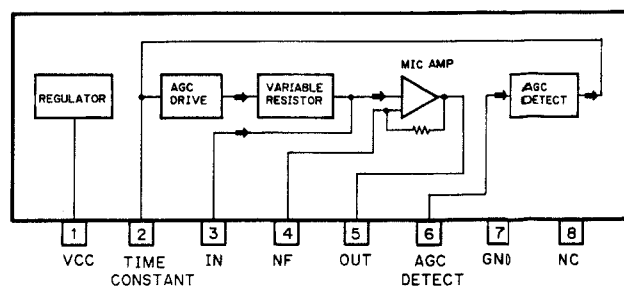


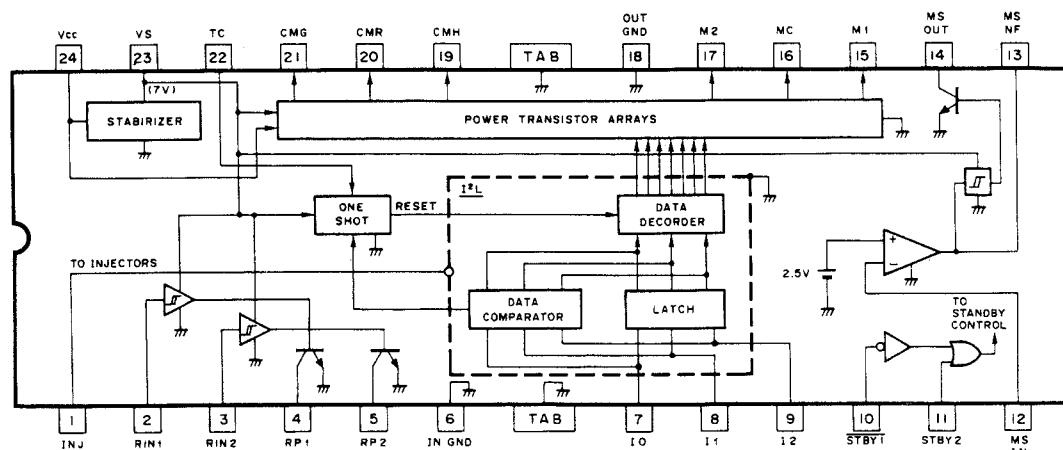
• Control Unit

M51522L (Pre Amp Unit)



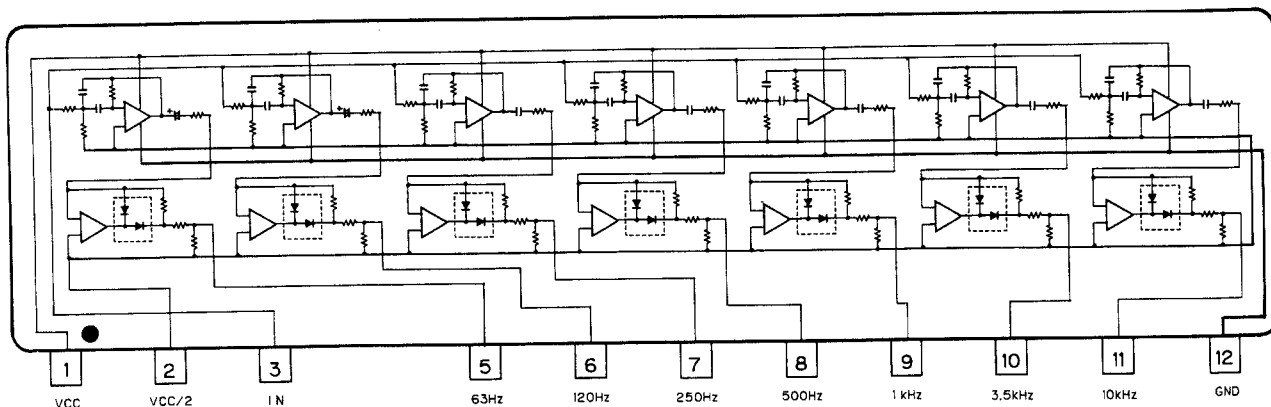
IC705: M51304L



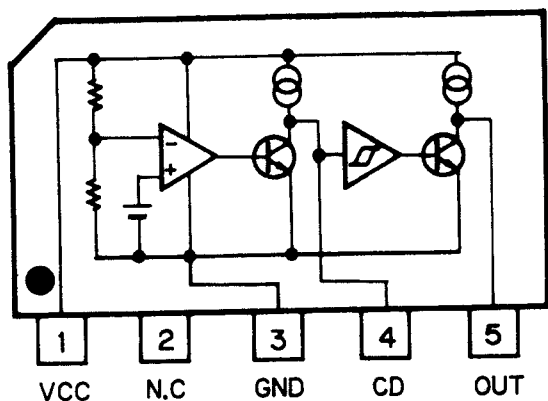
**PA3019 (Driver Unit)**


Pin No.	Pin Name	I/O	Function and Operation
1	INJ	Input	Power supply for internal logic ( $I^2L$ ).
2	R IN 1	Input	Input terminal for Relay Table Rotation Sensor (MR1) signal.
3	R IN 2	Input	Input terminal for Relay Table Rotation Sensor (MR2) signal.
4	RP 1	Output	Waveform output of Relay Sensor Input 1 (2 Pin) signal.
5	RP 2	Output	Waveform output of Relay Sensor Input 2 (3 Pin) signal.
6	IN GND	—	GND terminal of small-signal series.
7	I 0	Input	Logic input terminal for motor control
8	I 1	Input	
9	I 2	Input	
10	STBY 1	Input	Standby control. At active "L" (0.7V or less), the IC current is switched OFF.
11	STBY 2	Input	Standby control. At active "H" (3.5V or more), the IC current is switched OFF.
12	MS IN	Input	Amplifier input (inverted input) terminal for Music Sensing (MS).
13	MS NF	I/O	Output of the MS amplifier and input of the MS Schmitt circuit.
14	MS OUT	Output	Output of Schmitt circuit for MS. MS OUT outputs a pulse when the signal level of the MSNF terminal exceeds 0dBm or enters OPEN status when it is 0 dBm or less.
15	M1	Output	+ terminal drive output of motor M1 for the head table drive.
16	MC	Output	Drive output of the common terminal of motors M1 and M2.
17	M2	Output	+ terminal drive output of drive motor M2 of the FF/REW selecting gear.
18	OUT GND	—	GND terminal of the motor drive circuit.
19	CMH	Output	H ( + ) terminal drive output of capstan motor M3. Output voltage: During speed control = approx. $V_{cc}-1.7V$ During LOAD or EJECT = 6.9V
20	CMR	Output	R terminal drive output of capstan motor M3. (1) During speed control: OPEN (2) During LOAD: approx. 0V (3) During EJECT: approx. 7V
21	CMG	Output	GND ( - ) terminal drive output of capstan motor M3. (1) During speed control: approx. 0V (2) During LOAD/EJECT: OPEN
22	TC	Output	Connecting terminal of capacitor for setting the timer that switches OFF the power transistor for constant motor drive at a change in logic input I0, I1, I2.
23	VS	Output	Power supply for relay table rotation sensor. Approx. 7V.
24	Vcc	Input	Power supply terminal for IC.

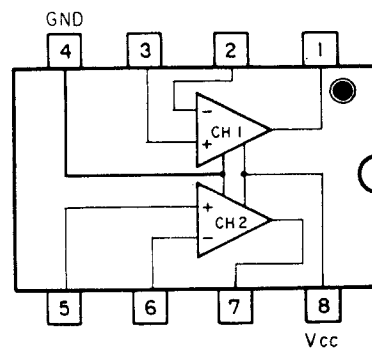
IC706 : KHA703



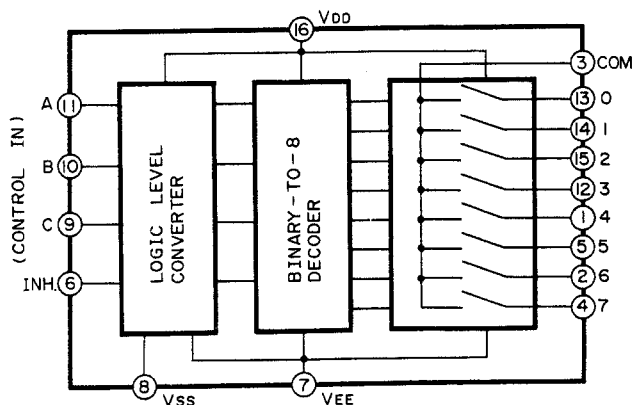
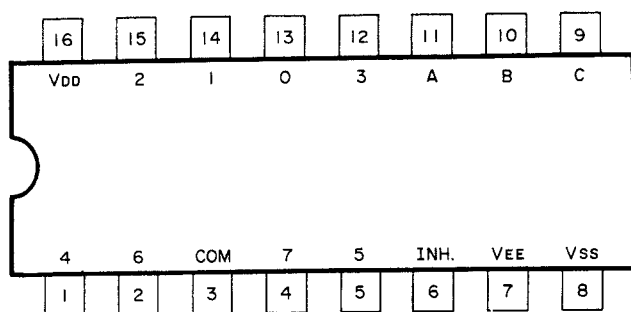
IC703 : M51954AL



IC708 : HA17358



IC707 : TC4051BF



TC4051BF is an eight-channel multiplexer that enables the selection and mixing of analogue and digital signals.

The switch corresponding to each channel is switched ON by the digital signal of the control terminal.

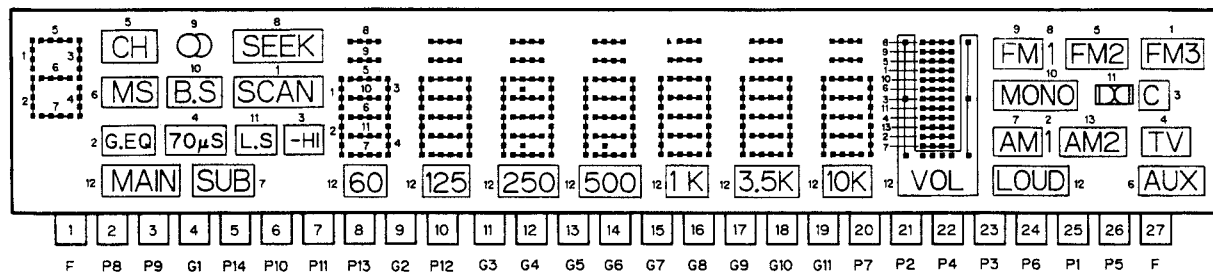
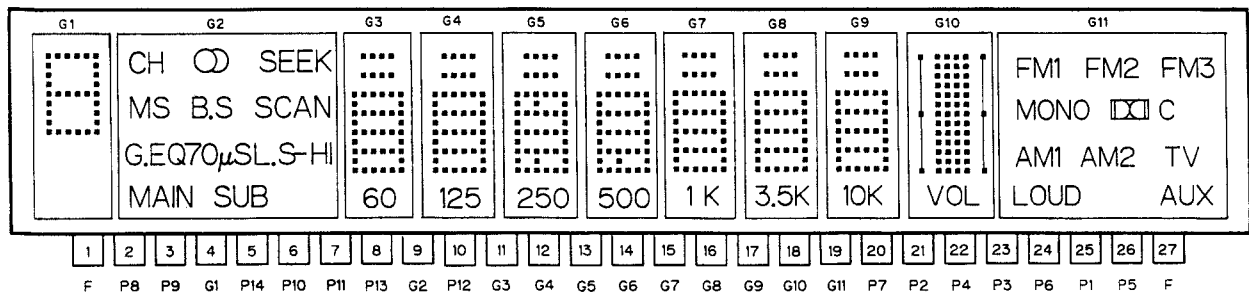
TC4051BF

Table of Logic Values

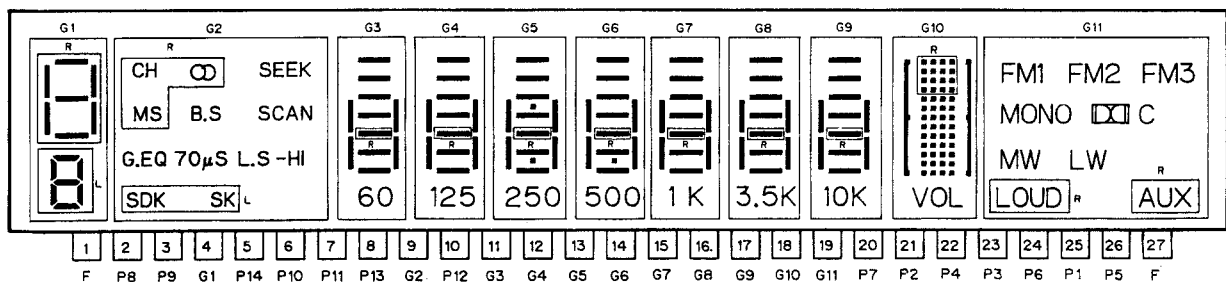
Control Input				"ON" Channel
INH.	C	B	A	
L	L	L	L	0
L	L	L	H	1
L	L	H	L	2
L	L	H	H	3
L	H	L	L	4
L	H	L	H	5
L	H	H	L	6
L	H	H	H	7

When "H" is input to INH., no channels will enter ON status regardless of any other input.

FL Tube : CAW1004 (KEX-900/ES)

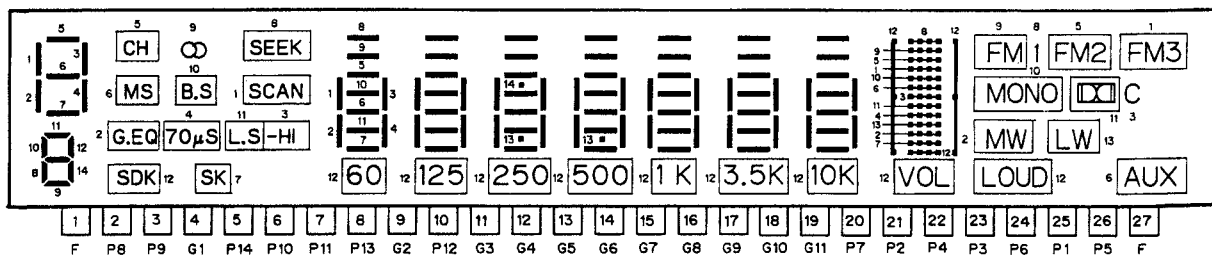


FL Tube: CAW1011 (KEX-900/EW, KEX-900SDK/WG)

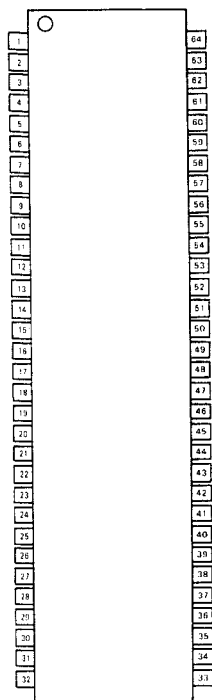


COLOR OF ILLUMINATION

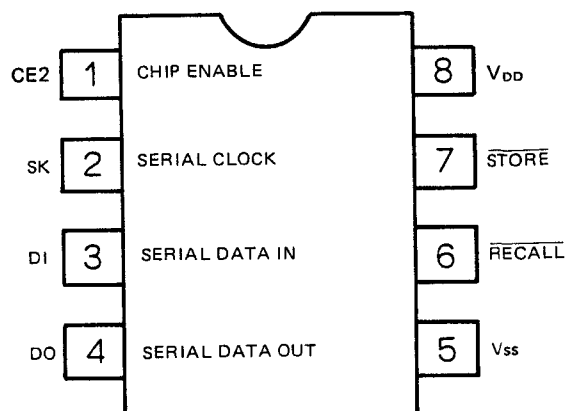
G : BLUE-GREEN (OTHERWISE SPECIFIED SEGMENTS.)  
L : LEMON  
R : RED



IC701: \*PD3069B



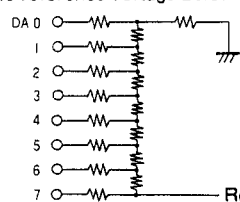
IC704 : PDH001 (EW, WG)



IC's marked by \* are MOS type.  
Be careful in handling them because they are very liable to be damaged by electrostatic induction.



# ● Terminal Functions of PD3069B

Pin No.	Pin name	I/O	I/O Format	Logic	Function and Operation	At RESET
1	APWIN	Input	Gate	H	<ul style="list-style-type: none"> <li>Audio power supply ON/OFF input terminal. • When "L" input, performs output of 200-ms standby data to the mechanical driver and inhibits VSENSE output.</li> <li>* At Audio Power ON, APWIN prevents malfunction of mechanical driver PA3019 by dropping the power voltage at Power Amp ON and also prevents error in judging the VSENSE status.</li> </ul>	Z
2	DROPEN	Output	P	H	<ul style="list-style-type: none"> <li>Door open solenoid control terminal. • At Acc ON in the DOOR CLOSE (DOOR SW: Make) status, EROPCN performs 100-ms pulse output when the DOOR OPEN key is switched ON.</li> <li>• While remaining in DOOR CLOSE status, only one DOOR OPEN key data is received per second. • MUTE output terminal.</li> </ul>	Z
3	MUTE	Output	P	H	<ul style="list-style-type: none"> <li>In Acc OFF status, MUTE performs "L" output. In Acc ON status, "L" is output only in TAPE OFF or TAPE PLAY status. TAPE OFF status: During system ALL OFF, TUNER AUX, DK interrupt.</li> </ul>	Z
4	TAPW	Output	P	H	<ul style="list-style-type: none"> <li>TAPE AUDIO (pre-amp, Dolby) power supply control terminal.</li> <li>• Performs constant "H" output during tape operation.</li> </ul>	Z
5	N.C					
6	KST 1	Output	P	H	<ul style="list-style-type: none"> <li>Strobe output for key scanning.</li> </ul> <p>Scan cycle: 10ms      Pulse width: 1 ms</p>	Z
7	KST 2	Output	P	H		Z
8	KST 3	Output	P	H		Z
9	KST 4	Output	P	H		Z

Pin No.	Pin Name	I/O	I/O Format	Logic	Function and Operation	At RESET																																																																								
10	MPA	Output	P	H	<div>● Multiplexer control output. ● At Acc ON, constant output is performed.</div> <table><tr><td></td><td>MPC</td><td>MPB</td><td>MPA</td><td>4051 Selecting Pin</td></tr><tr><td>63Hz</td><td>0</td><td>1</td><td>0</td><td>15</td></tr><tr><td>125Hz</td><td>0</td><td>0</td><td>1</td><td>14</td></tr><tr><td>250Hz</td><td>0</td><td>0</td><td>0</td><td>13</td></tr><tr><td>500Hz</td><td>0</td><td>1</td><td>1</td><td>12</td></tr><tr><td>1kHz</td><td>1</td><td>0</td><td>0</td><td>1</td></tr><tr><td>3kHz</td><td>1</td><td>1</td><td>0</td><td>2</td></tr><tr><td>10kHz</td><td>1</td><td>0</td><td>1</td><td>5</td></tr><tr><td>OFF</td><td>1</td><td>1</td><td>1</td><td>4</td></tr></table>		MPC	MPB	MPA	4051 Selecting Pin	63Hz	0	1	0	15	125Hz	0	0	1	14	250Hz	0	0	0	13	500Hz	0	1	1	12	1kHz	1	0	0	1	3kHz	1	1	0	2	10kHz	1	0	1	5	OFF	1	1	1	4	Z																											
	MPC	MPB	MPA	4051 Selecting Pin																																																																										
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3kHz	1	1	0	2																																																																										
10kHz	1	0	1	5																																																																										
OFF	1	1	1	4																																																																										
11	MPB	Output	P	H	Z																																																																									
12	MPC	Output	P	H	Z																																																																									
13	ALIVE	Output	P	H	<div>● Runaway detection output terminal for IC. ● At Acc ON, ALIVE changes from "H" to "L" at each 8-bit clock input.</div> <div>● In normal Acc ON status, ALIVE repeats H/L output.</div>	Z																																																																								
14	K1	Input	Gate	H	<div>● Key input terminal. ● Matrix configuration.</div> <table><tr><td></td><td>KST 1</td><td>KST 2</td><td>KST 3</td><td>KST 4</td></tr><tr><td>K1</td><td>DOOR SW</td><td>DR BAND</td><td>C AUTO</td><td>SP/GEQ</td></tr><tr><td>K2</td><td>VOL DWN</td><td>REW DWN</td><td>BS LOC</td><td>FUN</td></tr><tr><td>K3</td><td>VOL UP</td><td>FF UP</td><td>LOUD</td><td>OP/EJ</td></tr><tr><td>K4</td><td>—</td><td>(SCAN)</td><td>B</td><td>(DK)</td></tr></table> <div>Signals with parentheses are valid only in TEST mode.</div>		KST 1	KST 2	KST 3	KST 4	K1	DOOR SW	DR BAND	C AUTO	SP/GEQ	K2	VOL DWN	REW DWN	BS LOC	FUN	K3	VOL UP	FF UP	LOUD	OP/EJ	K4	—	(SCAN)	B	(DK)	Z																																															
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K3	VOL UP	FF UP	LOUD	OP/EJ																																																																										
K4	—	(SCAN)	B	(DK)																																																																										
15	K2	Input	Gate	H	Z																																																																									
16	K3	Input	Gate	H	Z																																																																									
17	K4	Input	Gate	H	Z																																																																									
18	LEVEL	Input	Gate		<div>● Spare analogue level input terminal. ● Connects comparator output A/D conversion.</div>	Z																																																																								
19	VDISP				<div>● Connected to GND.</div>																																																																									
20	Dolby ON/OFF	Output	CMOS	H	<div>● Dolby ON/OFF control output terminal. ● Outputs the "Dolby ON/OFF memory" contents during TAPE operation. ● Performs "H" output by Dolby B or C.</div>	H																																																																								
21	Dolby B/C	Output	CMOS	H	<div>● Dolby B/C selection output terminal. * Outputs the "Dolby B/C memory" contents during TAPE operation.</div> <div>Dolby B or Dolby B and C common OFF → "L" Dolby C → "H"</div>	H																																																																								
22	MS	Input	Gate	L	<div>● Music signal input terminal. ● Uses an internal timer to judge the presence/absence of a Song signal based on the "H"/"L" change in the terminal. ● Input provided with trailing latch.</div>																																																																									
23	N.C																																																																													
24	DA 0	Output	CMOS		<div>● Reference voltage data output terminal for spare analogue A/D conversion. ● With an externally installed ladder resistor, DA0-DA7 outputs the reference voltage below:</div> <div></div> <div>Reference voltage</div> <table><tr><td>DA7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td>0</td><td>Reference voltage</td></tr><tr><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0.0</td></tr><tr><td>0</td><td>0</td><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0.38</td></tr><tr><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0.60</td></tr><tr><td>0</td><td>0</td><td>1</td><td>0</td><td>1</td><td>1</td><td>0</td><td>1</td><td>0.96</td></tr><tr><td>0</td><td>1</td><td>0</td><td>0</td><td>0</td><td>1</td><td>1</td><td>0</td><td>1.50</td></tr><tr><td>0</td><td>1</td><td>1</td><td>0</td><td>1</td><td>1</td><td>1</td><td>1</td><td>2.38</td></tr><tr><td>1</td><td>0</td><td>1</td><td>1</td><td>0</td><td>0</td><td>0</td><td>1</td><td>3.78</td></tr></table> <div>(VDD = 5.5V)</div>	DA7	6	5	4	3	2	1	0	Reference voltage	0	0	0	0	0	0	0	0	0.0	0	0	0	1	0	0	0	0	0.38	0	0	0	1	1	1	0	0	0.60	0	0	1	0	1	1	0	1	0.96	0	1	0	0	0	1	1	0	1.50	0	1	1	0	1	1	1	1	2.38	1	0	1	1	0	0	0	1	3.78	H
DA7	6	5	4	3		2	1	0	Reference voltage																																																																					
0	0	0	0	0		0	0	0	0.0																																																																					
0	0	0	1	0		0	0	0	0.38																																																																					
0	0	0	1	1		1	0	0	0.60																																																																					
0	0	1	0	1		1	0	1	0.96																																																																					
0	1	0	0	0		1	1	0	1.50																																																																					
0	1	1	0	1		1	1	1	2.38																																																																					
1	0	1	1	0	0	0	1	3.78																																																																						
25	DA 1	Output	CMOS		H																																																																									
26	DA 2	Output	CMOS		H																																																																									
27	DA 3	Output	CMOS		H																																																																									
28	DA 4	Output	CMOS		H																																																																									
29	DA 5	Output	CMOS		H																																																																									
30	DA 7	Output	CMOS		H																																																																									
31	DA 7	Output	CMOS		H																																																																									

(V<sub>DD</sub> = 5.5V)

Pin No.	Pin Name	I/O	I/O Format	Logic	Function and Operation	At RESET																																								
32	VDD		—	—	● Connected to +5V power supply.																																									
33	SCK	I/O	Gate input CMOS Output		● 8-bit serial data communication clock I/O terminal. ● SCK is in high-impedance in INPUT mode, and performs CMOS output in mode.	Z																																								
34	SI	Input	Gate input		● 8-bit serial data input terminal.	Z																																								
35	SO	Output	CMOS		● 8-bit serial data output terminal	H																																								
36	900/500	Input	RUP		● KEX-900/KEX-500 model-selection input terminal. ● KEX-900 = "H"; KEX-500 = "L". ● Built-in pull-up resistor.	Z																																								
37	70μ	Output	CMOS	H	● Output terminal for the 70 ON/OFF memory contents during deck operation. ● 70μ = mechanical auto sensing.	H																																								
38	STOP	Output	CMOS	L	● Main motor ON/OFF control terminal. ● Outputs "L" during Deck OFF status or Power Loading. ● "L" is output during the mechanical transition of the deck operating state from mechanical Fast-Forward (Rewind) to PLAY, RLS or EJECT. In other states, "H" is output.	H																																								
39	PLAY	Output	CMOS	L	● Filter-switching output terminal of MS in PLAY/FF modes. ● "L" is output during deck operating state of PLAY; "H" is output in other states. * "L" is output during Deck OFF status and during Power Loading.	H																																								
40	STBY2	Output	CMOS	H	● Connects and controls STBY2 of mechanical motor driver PA3019. ● "H" is output only during hard reset of IC; "L" is output in all other cases.	H																																								
41	STBY1	Output	CMOS	L	● Connects and controls STBY1 of mechanical motor driver PA3019. ● "H" is output only during hard reset of IC; "L" is output in all other cases.	H																																								
42	I 2	Output	CMOS		● Control data output terminal with respect to mechanical motor driver PA3019. 6 The output pattern is as below: <table><tr><th colspan="3">CM</th><th>M1 · M2</th></tr><tr><th>12</th><th>11</th><th>10</th><th>Control mode</th></tr><tr><td>0</td><td>0</td><td>0</td><td>OFF</td></tr><tr><td>0</td><td>0</td><td>1</td><td>Power LOAD forward rotation</td></tr><tr><td>0</td><td>1</td><td>0</td><td>Power LOAD forward rotation</td></tr><tr><td>0</td><td>1</td><td>1</td><td>SPEED CONT</td></tr><tr><td>1</td><td>0</td><td>0</td><td>↑</td></tr><tr><td>1</td><td>0</td><td>1</td><td>↑</td></tr><tr><td>1</td><td>1</td><td>0</td><td>↑</td></tr><tr><td>1</td><td>1</td><td>1</td><td>↑</td></tr></table>	CM			M1 · M2	12	11	10	Control mode	0	0	0	OFF	0	0	1	Power LOAD forward rotation	0	1	0	Power LOAD forward rotation	0	1	1	SPEED CONT	1	0	0	↑	1	0	1	↑	1	1	0	↑	1	1	1	↑	H
CM			M1 · M2																																											
12	11	10	Control mode																																											
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0	1	1	SPEED CONT																																											
1	0	0	↑																																											
1	0	1	↑																																											
1	1	0	↑																																											
1	1	1	↑																																											
43	I 1	Output	CMOS		H																																									
44	I 0	output	CMOS		H																																									
45	RES	Input	RUP	L	● Reel table rotation pulse input terminal. ● Detects rotation according to "H"/"L" change. ● A continuous "H" status for 1.2 s is regarded as the TAPE END status.	H																																								
46	NES	Input	RUP	L																																										
47	AUX	Input	RUP	L	● AUX mode input terminal. ● Detects AUX+B and performs input. ● Transmits data by data communication to the system controller.	H																																								
48	DIM	Input	RUP	L	● Dimmer input terminal. * Detects and inputs the illumination line. ● Transmits data by data communication to the system controller. (The system controller lowers the luminance of the FL display.)	H																																								
49	RESET	Input	Gate input	H	● Initialize/Reset input terminal of ICs.	Z																																								
50	TEST	Input	Gate input	L	● Test input terminal for IC mechanisms.	Z																																								
51	OSC 1	Input			● Terminal for generating the ICclock.																																									
52	OSC 2	Output			● Employs a 4-MHz ceramic oscillator element.																																									
53	VSS				● Power supply terminal. ● Connected to GND.																																									
54	CHECK 0	Input	RUP	L	● Setting of CHECK0, CHECK1 selects the CHECK mode.  1 Unit Check mode 2 Communication OFF mode When RESET is initiated in the above modes, the respective mode is entered. 1 is used with the unit checker (control checker). (Not used in actual servicing) 2 is mode enabling independent mechanical operation of the control p. c. board and can be controlled by usual key input.	H																																								
55	CHECK 1	Input	RUP	L		H																																								

Pin No.	Pin Name	I/O	I/O Format	Logic	Function and Operation	At RESET																				
56	VSENSE	Input	Gate	H	● PA3019 supply voltage sensor input terminal. ● At “H” input, the mechanism is stopped and the system controller is informed by data communication of the Emergency status. ● ON chatter (  ) 20 ms ● OFF chatter (  ) 1s ● “H” is output in the cases below: (1) By loss of power at PA3019 (2) By excess voltage at PA3019 (3) By excess current at PA3019	Z																				
57	DIS	Output	CMOS	H	● Control output terminal of Disable B line. ● Constant “H” output during TAPE or TUNER. ● “H” is output for about 1 s at Acc ON/OFF. ● ON/OFF switching is done by a command from the system controller.																					
58	SW 4	Input	Gate		● Mechanical switch matrix input terminal. ● Detects the status of the head position, gear position, etc. by a matrix with Strobe signals ST1-ST3. <table border="1"><tr><td></td><td>SW 1</td><td>SW 2</td><td>SW 3</td><td>SW 4</td></tr><tr><td>ST 1</td><td>Np</td><td>MSp</td><td>EJp</td><td>Rp</td></tr><tr><td>ST 2</td><td>L</td><td>—</td><td>C</td><td>R</td></tr><tr><td>ST 3</td><td>LOAD</td><td>SET</td><td>70μ</td><td>—</td></tr></table>		SW 1	SW 2	SW 3	SW 4	ST 1	Np	MSp	EJp	Rp	ST 2	L	—	C	R	ST 3	LOAD	SET	70μ	—	Z
	SW 1	SW 2	SW 3	SW 4																						
ST 1	Np	MSp	EJp	Rp																						
ST 2	L	—	C	R																						
ST 3	LOAD	SET	70μ	—																						
59	SW 3	Input	Gate		Z																					
60	SW 2	Input	Gate		Z																					
61	SW 1	Input	Gate		Z																					
62	ST 1	Output	P	H	● Strobe signal output terminals for the mechanical switch matrix. ● ST1: head position sensing strobe; ST2: FF/RES gear position sensing strobe; ST3: LOAD, SET, 70μ switch sensing strobe.	Z																				
63	ST 2	Output	P	H		Z																				
64	ST 3	Output	P	H		Z																				

I/O Format

P: P-ch OPEN drain output

RUP: Input with built-in Pull-up resistor

At RESET

Z: High-impedance state

### • Communication OFF Mode

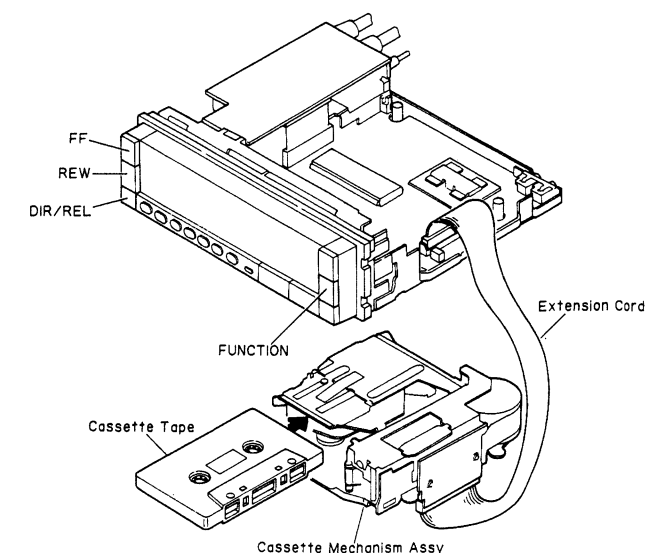
The deck controller (IC701: PD3069B) and system controller (IC901: PD4092A) usually conduct data communication. In this mode, however, the cassette mechanism can be operated by only the deck controller despite the ceasing of communication. (IC901: PD4091 ..... EW, WG)

### • How to Enter the Communication OFF Mode:

1. Perform grounding of 55 Pin of IC701.
2. Switch ON the back-up power supply and ACC power supply.
3. Disconnect Pin 55 of IC701 from ground.
4. Insert a cassette tape.
5. When the cassette tape is loading, the cassette mechanism stops once. It recommences operation by pressing a Function key and enters PLAY mode.
6. Operation can be confirmed by usual key input.

### • Cancellation of the Communication OFF Mode

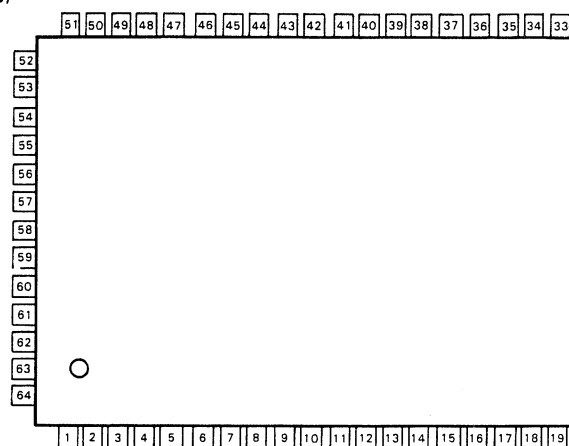
This mode can be cancelled by switching OFF the back-up power supply and ACC power supply, and ACC power supply, then switching them ON again.



At RESET	Z
ut, the data	Z
mand	
atus of signals	Z
	Z
	Z
atrix. tion	Z
	Z
	Z

### ● Display Unit

IC901 : \*PD4091 (EW, WG)  
\*PD4092A (ES)

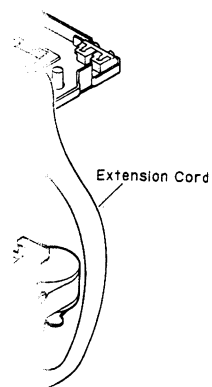


IC's marked by \* are MOS type.

Be careful in handling them because they are very liable to be damaged by electrostatic induction.

### ● Terminal Functions of PD4091, PD4092A

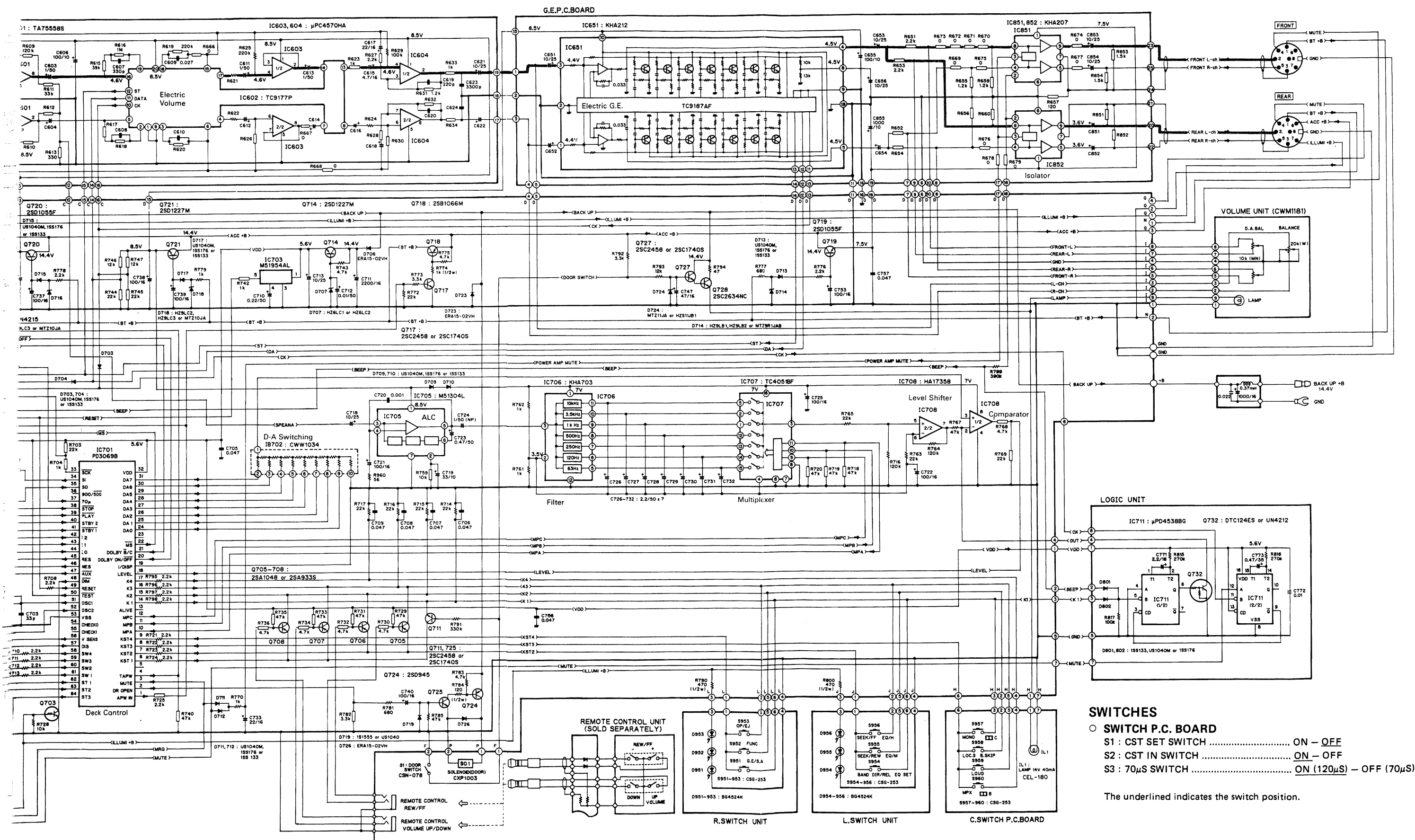
Pin No.	Pin Name	I/O	Function and Operation																				
1	N. C	—	Not used.																				
2	MRQ	Input	MUTE request input terminal. At “H” input, the amount of electronic volume attenuation is maximized and Isolate Mute is concurrently output from the MUTE terminal (53 Pin).																				
3	SCK	I/O	Shift clock input/output terminal for the serial interface. Frequency during clock output: 65.5kHz.																				
4	Tr B	Output	Data output terminal for the serial interface.																				
5	Tr C	Input	Data input terminal for the serial interface.																				
6	ACC	Input	Acc sensing input terminal. Active low.																				
7	MOD 0	Input	Input terminal for selecting the application destination. <table border="1"><thead><tr><th>MOD 0</th><th>MOD 1</th><th>Destination</th></tr></thead><tbody><tr><td>L</td><td>L</td><td>Commercial model</td></tr><tr><td>L</td><td>H</td><td>ES</td></tr><tr><td>H</td><td>L</td><td>EW</td></tr><tr><td>H</td><td>H</td><td>WG</td></tr></tbody></table> EW and WG use the dedicated microcomputer PD4091 and are thus not used with PD4092A.	MOD 0	MOD 1	Destination	L	L	Commercial model	L	H	ES	H	L	EW	H	H	WG					
MOD 0	MOD 1			Destination																			
L	L			Commercial model																			
L	H			ES																			
H	L			EW																			
H	H	WG																					
8	MOD 1																						
9	SEC	Input	Not used. (Data input terminal for anti-theft use)																				
10	NC	Output	Set to OPEN.																				
11	STB 0	Output	Key matrix input terminals. Active high.																				
12	STB 1																						
13	STB 2																						
14	K0	Input	Key matrix input terminals. Active high. <table border="1"><thead><tr><th></th><th>K 0</th><th>K 1</th><th>K 2</th><th>K 3</th></tr></thead><tbody><tr><td>STB 0</td><td>0</td><td>1</td><td>—</td><td>2</td></tr><tr><td>STB 1</td><td>—</td><td>AS</td><td>VOL +</td><td>VOL —</td></tr><tr><td>STB 2</td><td>3</td><td>4</td><td>CLOCK</td><td>5</td></tr></tbody></table>		K 0	K 1	K 2	K 3	STB 0	0	1	—	2	STB 1	—	AS	VOL +	VOL —	STB 2	3	4	CLOCK	5
	K 0			K 1	K 2	K 3																	
STB 0	0			1	—	2																	
STB 1	—			AS	VOL +	VOL —																	
STB 2	3	4	CLOCK	5																			
15	K 1																						
16	K 2																						
17	K 3																						
18 — 21	NC	Input	Not used. Set to V or Vss level.																				
22	EVENT	Input	Not used. Connected to GND.																				
23	X 2	Output	Crystal oscillating element connection terminal.																				
24	X 1	Input	Oscillating frequency: 4.19MHz.																				



Pin No.	Pin Name	I/O	Function and Operation
25	Vss	—	Power supply terminal. Connected to GND.
26	VDD	—	Power supply terminal. +5V input.
27	P5	Output	Display segment drive output. Active high. P-ch OPEN drain output. Internally pulled-down by VLOAD (−28V).
28	P1		
29	P6		
30	P3		
31	P4		
32	P2		
33	P7		
34	P12		
35	P13, 14		
36	P11		
37	P10		
38	P9		
39	P8		
40 — 50	G11 — G1	Output	Display timing driving output. Active high. P-ch OPEN drain output. Internally pulled-down by VLOAD (−28V).
			<p>The parentheses indicate the value in DIMMER mode.</p>
51	VLOAD	Input	Display driver power supply input terminal. Connected to D/D converter DC output (−28V)
52	VPRE	Input	Display pre-driver power supply terminal. Connected to GND.
53	MUTE	Output	Isolator MUTE output terminal. Active high. Output when the source is switched. Pre-muting: approx. 50ms Post-muting: approx. 1.5s Output when MRQ is input. Output at VR MIN status.
54	CE 1	Output	Hideaway tuner control output. Active high. Output when the tuner is connected.
55	ST	Output	Control data latch output for electronic volume ad electronic GEQ. Active high. Output when electronic volume and electronic GEQ are set.
56	N. C	Output	Not used. Set to OPEN.
57	INT 1	Input	Not used. Connected to GND.
58	VDD	—	Power supply terminal. +5V.
59	AUC	Output	Control data output terminal for electronic volume and electronic GEQ. Active high. AUC also functions as the data shift clock output terminal for anti-theft use. (PD4091)
60	SK	Output	Control data shift clock output for electronic volume and electronic GEQ. Active high. Output when electronic volume and electronic GEQ are set. SK also functions as the data shift clock output terminal for anti-theft use. (PD4091)
61	CE 2	Output	Not used. Non-volatile RAM PDH001 chip for anti-theft use. Enable output terminal. Active high.
62	TUON	Output	BT+B control terminal. Active high. "H" output when the source is ON.
63	RESET	Input	Reset signal input terminal. Active high. During Reset status, all input/output terminals are in high-impedance state.
64	BEEP	Output	BEEP waveform output terminal. Frequency: approx. 4kHz. Output time: approx. 40ms.







# SWITCHES

## SWITCH P.C. BOARD

- S1 : CST SET SWITCH ..... ON - OFF
- S2 : CST IN SWITCH ..... ON - OFF
- S3 : 70μS SWITCH ..... ON (120μS) - OFF (70μS)

The underlined indicates the switch position.

Fig. 12

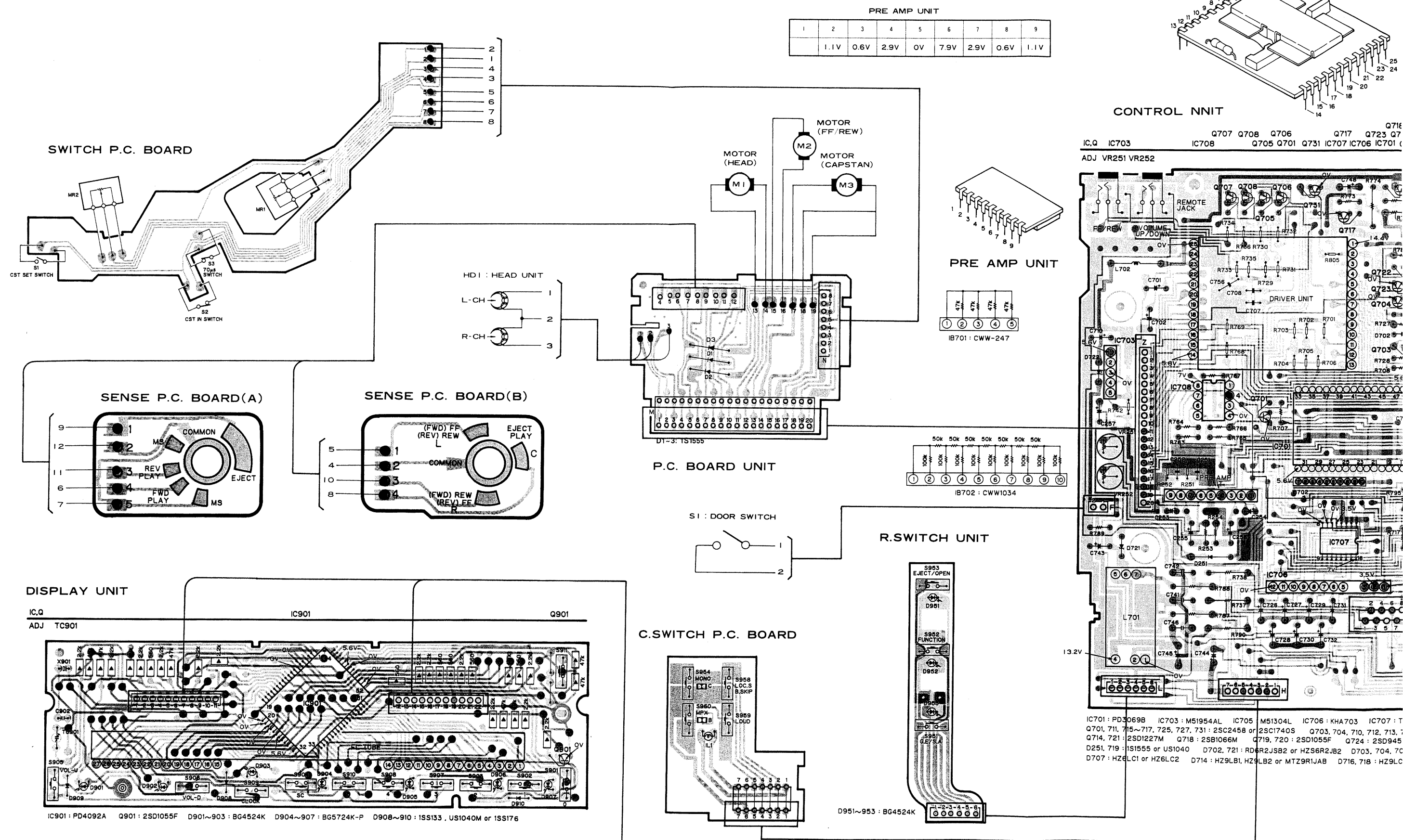
# 5. CONNECTION DIAGRAM (KEX-900/ES)

A

B

C

D









7

8

9

10

11

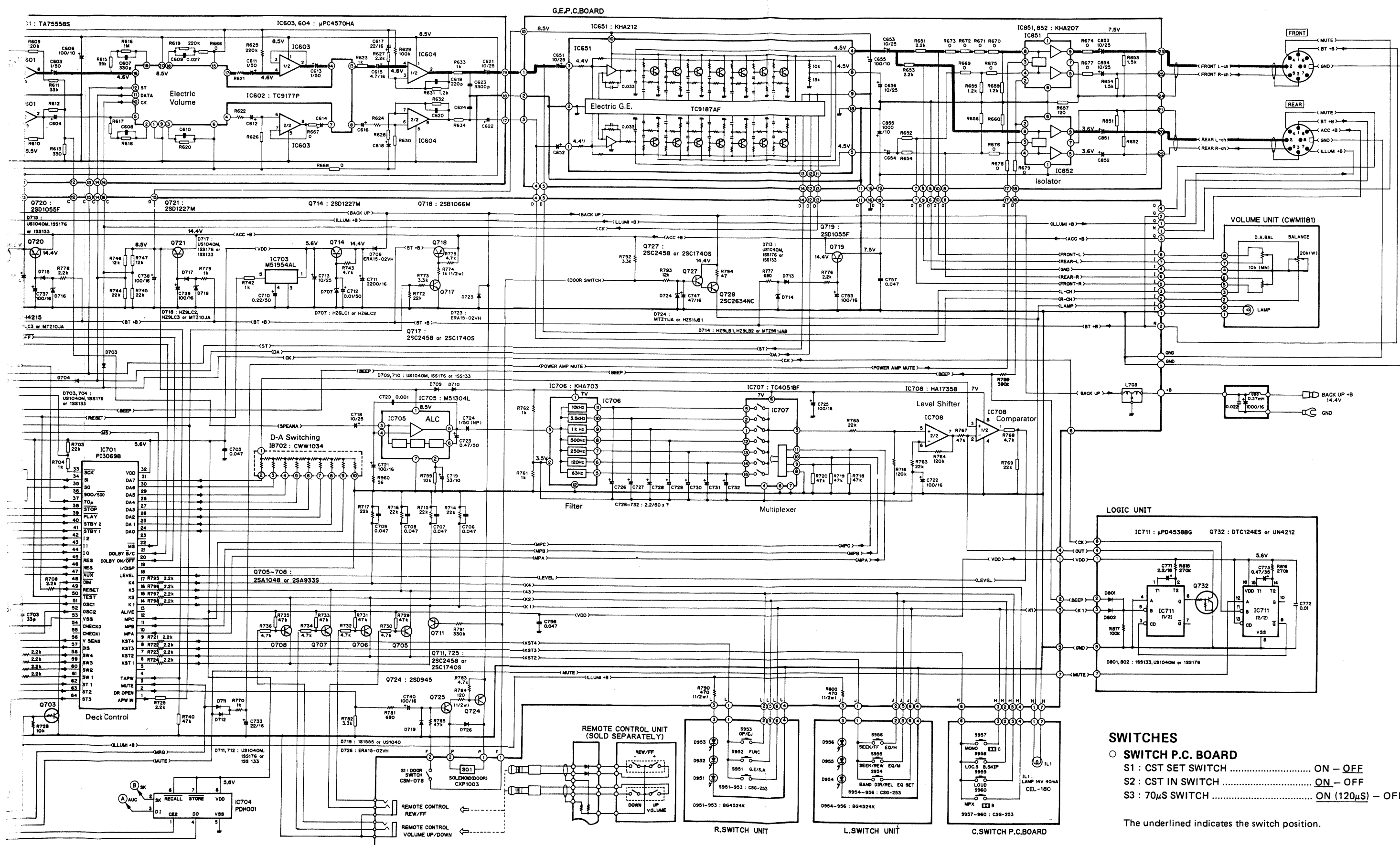
12

A

B

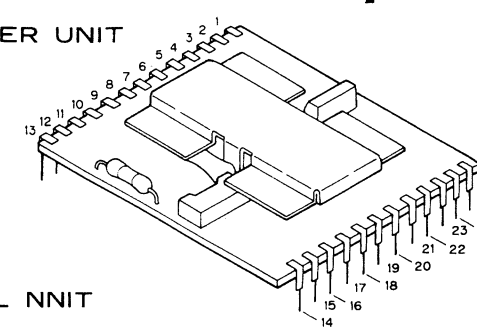
C

D

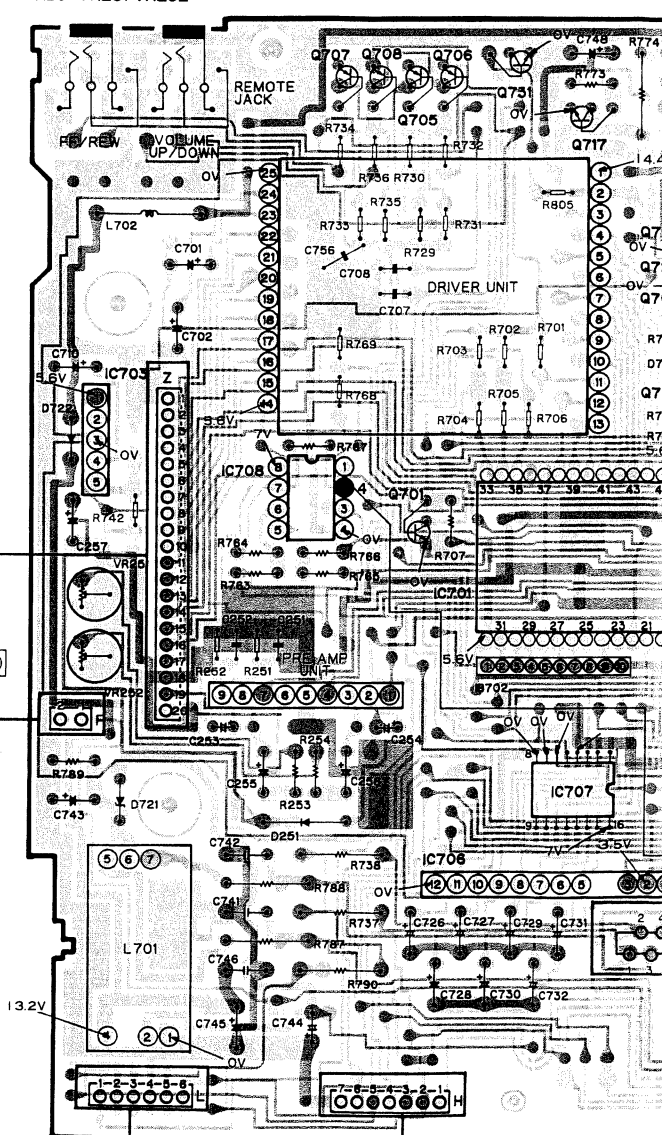




## 6

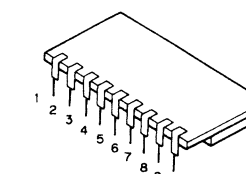


		Q707	Q708	Q706	Q717	Q72
IC,Q	IC703	IC708	Q705	Q701	Q731	IC707 IC706 IC
ADJ VR251 VR252						



IC701: PD30698 IC703: M51954AL IC705 M51304L IC706: KHA703 IC707: H715~717, 725, 727, 731: 2SC2458 or 2SC1740S Q703, 704, 710, 712, 714, 721: 2SD1227M Q718: 2SB1056M Q719, 720: 2SD1055F Q724: 2SD151, 719: H31555 or US1040 D702, 721: RD6R2JS82 or HZSR62JB2 D703, 706, 707: HZSLC1 or HZ6LC2 D714: HZ9LBJ, HZ91R2 or MT79R1AR D716, 718: HZ91R2

1	2	3	4	5	6	7	8	9
	1.1V	0.6V	2.9V	0V	7.9V	2.9V	0.6V	1.1V



IB702 : CWW1034

SI : DOOR SWITCH

The diagram shows a horizontal line with a switch symbol (two circles connected by a diagonal line) in the middle. A vertical line descends from the left circle and connects to a bottom horizontal line.

[illegible]

D951~953 : BG4524K

Diagram of the front panel of a VCR with numbered callouts (1-5) and labels for various controls:

- 1**: Power button
- 2**: Stop/Eject button
- 3**: Reverse Play (REV PLAY) button
- 4**: Fast Forward (FWD PLAY) button
- 5**: Play button
- COMMON**: Common function button
- EJECT**: Eject button
- MS**: Memory Stop button

Diagram of a 4-pin DIN connector for a cassette deck. The pins are labeled 1, 2, 3, and 4. Pin 1 is connected to (FWD) FF and (REV) REW. Pin 2 is connected to COMMON. Pin 3 is connected to (FWD) REW and (REV) FF. Pin 4 is connected to EJECT and PLAY. The diagram also shows a central circular area with labels C and R.

IC901 : PD4091      Q901 : 2SD1055F      D901, 902 : BG4524K      D904~907 : BG5724K-P      D908~910 : 1SS133

DI~3: IS1555

SI : DOOR SWITCH



12



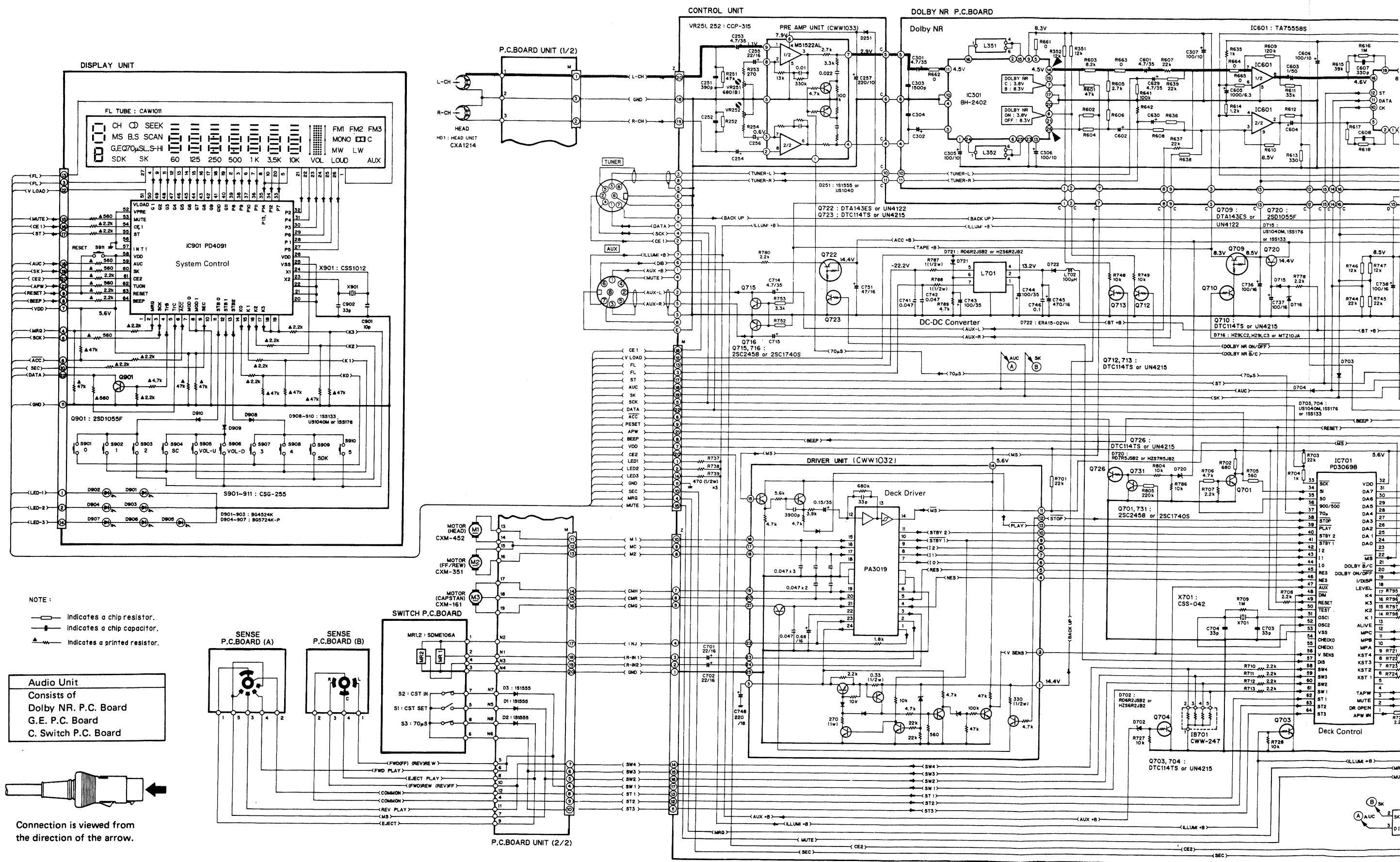
## 8. SCHEMATIC CIRCUIT DIAGRAM (KEX-900SDK/WG)

A

B

C

D



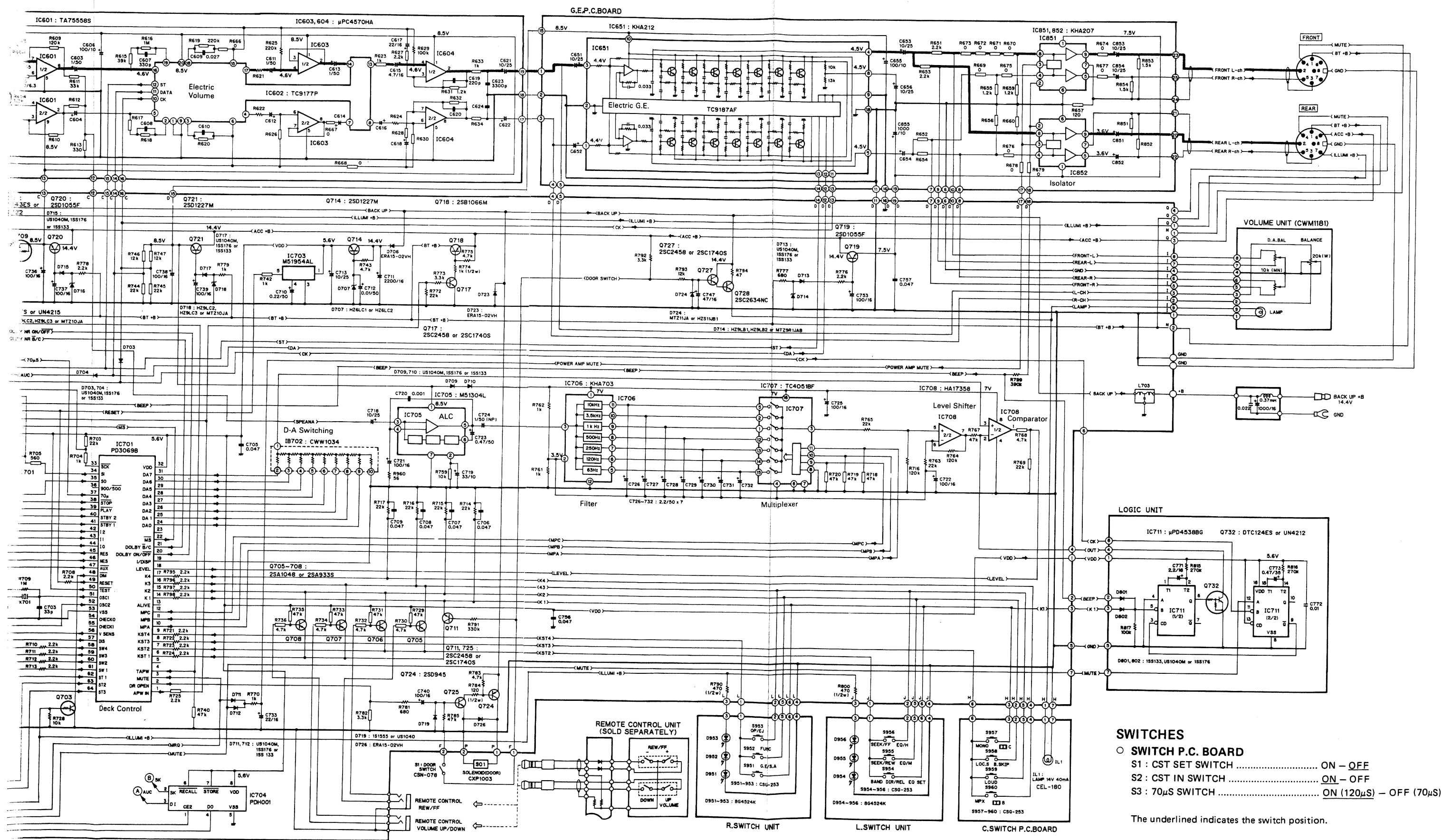
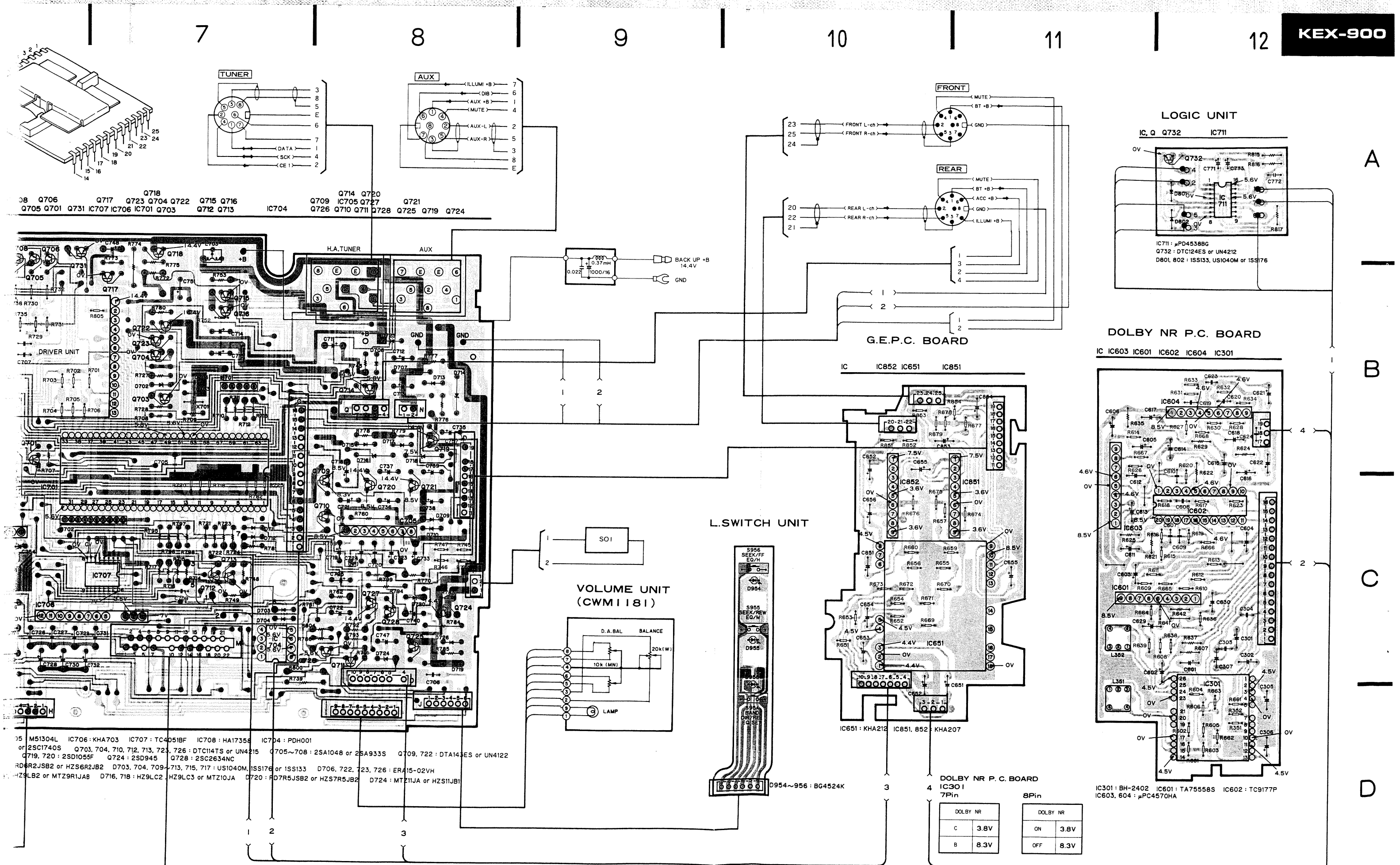


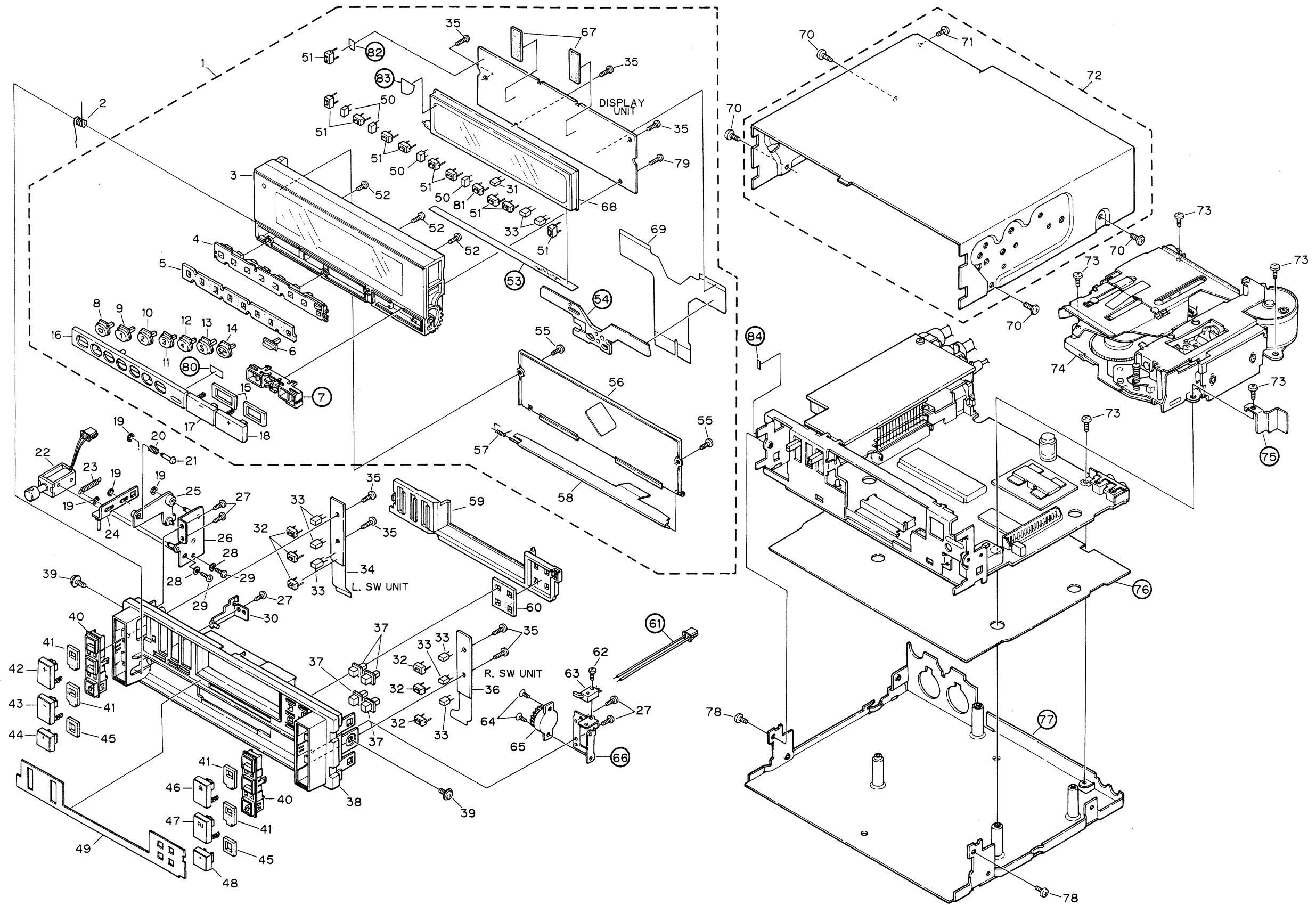
Fig. 16







# 10. CABINET EXPLODED VIEW



## Parts

### NOTE:

- For y marks
- ★: G This c. model
- Parts v
- Parts r longer

### Mark



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Fig. 18

# Parts List

## NOTE:

- For your parts Stock Control, the fast moving items are indicated with the marks \*\* and \*.
- \*\* : GENERALLY MOVES FASTER THAN \*.
- This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- Parts whose parts numbers are omitted are subject to being not supplied.
- Parts marked by "●" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
●	1.	CWS1042	Display Unit (ES)		38.	CNS1129	Grille
●		CWS1041	Display Unit (EW)		39.	PMS30P040FMC	Screw
●		CWS1040	Display Unit (WG)		40.	CNV1202	Holder
	2.	CBH1037	Spring		41.	CNM1249	Cushion
	3.	CXA1257	Grille Unit (ES)	*	42.	CAC1168	Button (ES)
		CXA1462	Grille Unit (EW)	*		CAC1283	Button (EW, WG)
		CXA1542	Grille Unit (WG)	*	43.	CAC1170	Button (ES)
	4.	CNV1169	Holder	*		CAC1284	Button (EW, WG)
	5.	CNM1193	Cushion	*	44.	CAC1171	Button
*	6.	CAC1229	Button (ES)		45.	CNM1250	Cushion
		VACANT	(EW)	*	46.	CAC1169	Button
*		CAC1233	Button (WG)	*	47.	CAC1152	Button
	7.		Holder	*	48.	CAC1172	Button
*	8.	CAC1153	Button (0)		49.	CNM1352	Cover (ES)
*	9.	CAC1154	Button (1)			CNM1185	Cover (EW, WG)
*	10.	CAC1155	Button (2)	*	50.	BG5724K-P	LED
*	11.	CAC1156	Button (3)	**	51.	CSG-255	Switch
*	12.	CAC1157	Button (4)		52.	PPZ20P050FMC	Screw
*	13.	CAC1158	Button (5)		53.		Cover
*	14.	CAC1177	Button (SC)		54.		Spacer
	15.	CNM1266	Cushion		55.	BTZ20P060FZK	Screw
	16.	CWS1042	Escutcheon (ES)		56.	CXA1456	Plate Unit
		CWS1041	Escutcheon (EW)		57.	CBH1001	Spring
		CWS1040	Escutcheon (WG)		58.	CAT1029	Door
*	17.	CAC1174	Button		59.	CNV1167	Lens
*	18.	CAC1175	Button		60.	CNM1186	Cushion
	19.	YE15FUC	Washer		61.		Connector
	20.	CBH1088	Spring		62.	CBA-172	Screw
	21.	CLA1111	Shaft	**	63.	CSN-078	Switch
*	22.	CXP1003	Solenoid		64.	CMZ20P040FMC	Screw
	23.	CBH-909	Spring		65.	CXD-766	Damper Unit
	24.	CXA1153	Lever Unit		66.		Holder
	25.	CXA1558	Arm Unit		67.	CNM1189	Cushion
	26.	CXD-868	Bracket Unit		68.	CAW1004	FL Tube (ES)
	27.	BPZ20P050FMC	Screw			CAW1011	FL Tube (EW, WG)
	28.	WB20FMC	Washer		69.	CNP1212	P.C. Board
	29.	BMZ20P025FMC	Screw		70.	CBA-178	Screw
	30.	CNC1199	Holder		71.	BMZ26P040FZK	Screw
*	31.	BG4524K	LED (ES, WG)		72.	CXA1260	Case Unit
**	32.	CSG-253	Switch		73.	BMZ26P050FMC	Screw
*	33.	BG4524K	LED	●	74.	CXK1645	Cassette Mechanism Assy
	34.	CNP1211	P.C. Board		75.		Shield Plate Assy
	35.	PPZ20P080FMC	Screw		76.		Insulator
	36.	CNP1210	P.C. Board		77.		Chassis Unit
*	37.	CAE-121	Button		78.	BMZ26P040FMC	Screw

Mark	No.	Part No.	Description
	79.	BPZ20P100FMC	Screw
	80.		Filter
**	81.	CSG-255	Switch (ES, WG)
	82.		Spacer
	83.		Cover
	84.		Spacer

## 11. CHASSIS EXPLODED VIEW

### Parts List

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1.	CWM1181	Volume Unit (Complex Unit)		26.		Bracket
	2.	CNV1288	Cover		27.	CWW1032	Driver Unit
	3.		Frame		28.		Spacer
*	4.	CAC1228	Knob		29.	CDE1316	DIN Cord
**	5.	CSG-253	Switch		30.	CDE1247	DIN Cord
*	6.	CEL-180	Lamp, 14V40mA		31.	CDE1318	Cord
	7.		Connector		32.	CNV1308	Cap
	8.		Connector		33.	CNV1309	Cap
	9.	BMZ26P050FMC	Screw		34.	CKS-549	Socket
●	10.	CWG1009	Audio Unit		35.	CKS-550	Socket
	11.		Plug	●	36.	CWX1050	Logic Unit
	12.		Plug		37.		Bracket
	13.		Plug		38.	HKN-151	Jack
	14.		Plug		39.		Plug
	15.		Plug		40.	CWW1033	Pre Amp Unit
	16.		Insulator	●	41.	CWX1041	Control Unit (ES)
	17.		Connector			CWX1042	Control Unit (EW, WG)
	18.		Connector		42.	CNW-770	Cap
	19.		Plug				
	20.		Plug				
	21.		Connector				
	22.		Plug				
	23.	CKS1127	Connector				
	24.		Spacer				
	25.		Plug				

Fig. 18

• Chassis

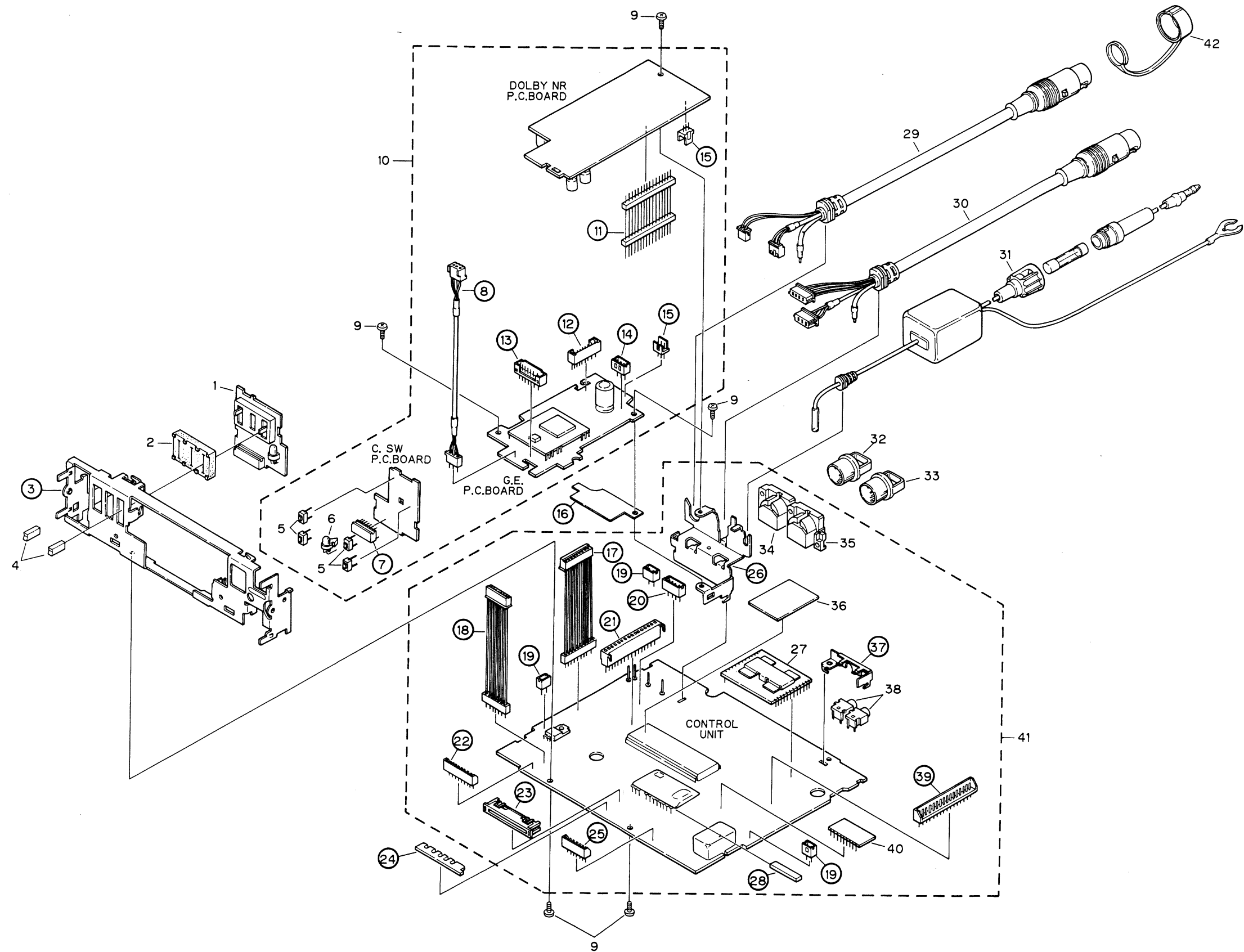


Fig. 19

## 12. CASSETTE MECHANISM ASSEMBLY EXPLODED VIEW

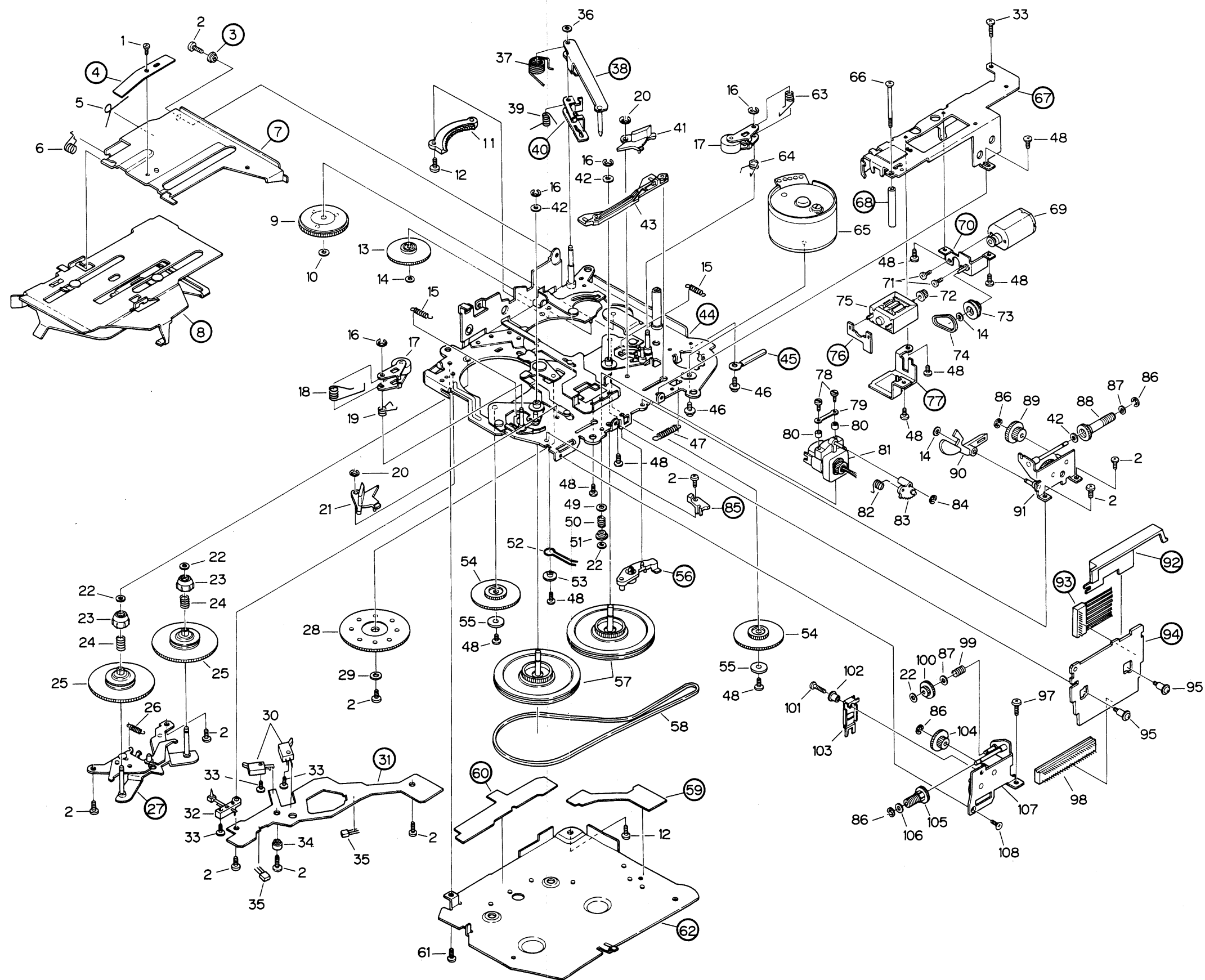


Fig. 20



## ● Parts List

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1.	HBA-147	Screw, M1.4 x 1.4		56.		Clamper
	2.	BMZ20P040FMC	Screw		57.	CNV1333	Flywheel
	3.		Bush	★ ★	58.	CNT-111	Belt
	4.		Spring		59.		Insulator
	5.	CBH-867	Spring		60.		Insulator
	6.	CBH-837	Spring		61.	BMZ20P030FMC	Screw
	7.		Arm		62.		Cover
	8.		Holder Unit		63.	CBH-831	Spring
	9.	CXD-900	Gear Unit		64.	CBH-833	Spring
	10.	HBH-119	Washer	★ ★	65.	CXM-161	Motor (Capstan)
	11.	CNV1075	Gear		66.	CBA-165	Screw, M2 x 25
	12.	CBA1004	Screw, M2 x 6		67.		Guide
	13.	CNY-271	Gear		68.		Spacer
	14.	CBF-126	Washer	★ ★	69.	CXM-452	Motor (Head Position)
	15.	CBH-835	Spring		70.		Bracket Unit
★ ★	16.	CBG1001	E type Washer		71.	HBA-244	Screw, M1.4 x 1.6
	17.	CXA1445	Pinch Roller Unit		72.	CNW-941	Gear
	18.	CBH-832	Spring		73.	CNY-075	Pulley
	19.	CBH-834	Spring	★ ★	74.	CNT-114	Belt
	20.	YE25FUC	Washer		75.	CXM-351	Motor (Gear Position)
	21.	CNW-930	Arm		76.		P.C. Board
	22.	CBF-135	Washer		77.		Bracket
	23.	CNW-932	Collar		78.	CBA-173	Screw, M1.4 x 8
	24.	CBH-827	Spring		79.	CBE-114	Spring
★ ★	25.	CXD-877	Reel Unit		80.	CNY-134	Azimuth Rubber
	26.	CBH-868	Spring	★ ★	81.	CXA1214	Head Unit
	27.		Bracket Unit		82.	CBH-829	Spring
	28.	CNW-944	Gear		83.	CNW-939	Gear
	29.	CLA1109	Collar		84.	YE15FUC	E type Washer
★ ★	30.	CSN-091	Switch (70μS, CST IN)		85.		Spacer
★ ★	31.		P.C. Board		86.	YE12FUC	E type Washer
	32.	CSN-089	Switch (CST SET)		87.	HBH-116	Washer
	33.	CBA-172	Screw, M1.7 x 5.5		88.	CNW-956	Gear
	34.	CLA1087	Collar		89.	CNW-955	Gear
	35.	SDME106A	Magnetic Resistive Device		90.	CNV1260	Arm
	36.	CBF-046	Washer		91.	CXA1432	Holder Assy
	37.	CBH-887	Spring		92.		Holder
	38.		Arm Unit		93.		Connector (8P)
	39.	CBH-886	Spring		94.		P.C. Board
	40.		Arm		95.	CBA1022	Screw, M2 x 2 x 3
	41.	CNW-931	Arm		96.	VACANT	
	42.	HBH-179	Washer		97.	BMZ20P060FMC	Screw
	43.	CNY-263	Lever		98.	CKS-678	Connector (40P)
	44.		Chassis Unit		99.	CBH-866	Spring
	45.		Clamper		100.	CNW-954	Gear
	46.	PMS26P030FMC	Screw		101.	HBA-158	Screw, M1.4 x 5
	47.	CBH-830	Spring		102.	CLB-750	Collar
	48.	HBA-175	Screw, M2 x 2.5		103.	CNH-004	Arm
	49.	CBE-123	Washer		104.	CNY-077	Gear
	50.	CBH-902	Spring		105.	CNY-148	Gear
	51.	HNC-953	Holder		106.	CBF-088	Washer
	52.	CBH-893	Spring		107.	CXA1433	Holder Assy
	53.	CLA1110	Collar		108.	HBA-209	Screw, M2 x 2
	54.	CNV1178	Gear				
	55.	CLA1108	Collar				

## 13. ELECTRICAL PARTS LIST

### NOTE:

When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560Ω	$56 \times 10^1$	561.....	RD1/4PS 5 6 1 J
47kΩ	$47 \times 10^3$	473.....	RD1/4PS 4 7 3 J
0.5Ω	0R5.....		RN2H 0 R 5 K
1Ω	010.....		RS1P 0 1 0 K

Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ  $562 \times 10^1$ ..... RN1/4SR 5 6 2 1 F

- For your parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.

★★: GENERALLY MOVES FASTER THAN ★.

This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

- Parts whose parts numbers are omitted are subject to being not supplied.
- The part numbers shown below indicate chip components.

Chip Resistor

RS1/8S □□□J, RS1/10S □□□J

Chip Capacitor (except for CQS.....)

CKS....., CCS....., CSZS.....

Audio Unit
Consists of
Dolby NR. P.C. Board
G.E. P.C. Board
C. Switch P.C. Board

### Audio Unit

#### MISCELLANEOUS

Mark	Symbol & Description	Part No.
★ ★	IC301	BH-2402
★ ★	IC601	TA75558S
★ ★	IC602	TC9177P
★ ★	IC603, 604	μPC4570HA
★ ★	IC651	KHA212
★ ★	IC851, 852	KHA207
	L351, 352 Coil	CTF1019
★ ★	IL1 Lamp, 14V40mA	CEL-180
★ ★	S957 - 960 Switch	CSG-253

#### RESISTORS

Mark	Symbol & Description	Part No.
	R607, 621, 622, 624, 625, 629, 635, 637, 642	RD1/4PS □□□JL
	Other Resistors	RS1/8S □□□J

#### CAPACITORS

Mark	Symbol & Description	Part No.
	C301, 302, 601, 602, 615, 616	CEA4R7M35LS
	C303, 304	CKSYB152K50
	C305 - 307, 606, 655	CEA101M10LL
	C603, 604, 611 - 614	CEA010M50LS2
	C605	CEA102M6R3L2
	C607, 608	CKSYB331K50
	C609, 610	CKSYB273K25
	C617, 618	CEA220M16LS
	C619, 620	CKSYB221K50
	C621, 622, 651 - 654, 656	CEA100M25LS
	C623, 624	CKSYB332K50
	C629, 630	CEA4R7M35LS
	C851 - 854	CEA100M25LS
	C855	CEA102M10L2

## Control Unit

## MISCELLANEOUS

Mark	Symbol & Description	Part No.
★ ★	IC701	PD3069B
★ ★	IC703	M51954AL
★ ★	IC704 (EW, WG)	PDH001
★ ★	IC705	M51304L
★ ★	IC706	KHA703
★ ★	IC707	TC4051BF
★ ★	IC708	HA17358
★ ★	Q701, 711, 715 – 717, 725, 727, 731	2SC2458 or 2SC1740S
★ ★	Q703, 704, 710, 712, 713, 723,	DTC114TS or
	726	UN4215
★ ★	Q705 – 708	2SA1048 or 2SA933S
★ ★	Q709, 722	DTA143ES or UN4122
★ ★	Q714, 721	2SD1227M
★ ★	Q718	2SB1066M
★ ★	Q719, 720	2SD1055F
★ ★	Q724	2SD945
★ ★	Q728	2SC2634NC
★	D251, 719	1S1555 or US1040
★	D702, 721	RD6R2JSB2 or HZS6R2JB2
★	D703, 704, 709 – 713, 715, 717	US1040M or
		1SS176 or 1SS133
★	D706, 722, 723, 726	ERA15-02VH
★	D707	HZ6LC1 or HZ6LC2
★	D714	HZ9LB1 or HZ9LB2 or MTZ9R1JAB
★	D716, 718	HZ9LC2 or HZ9LC3 or
		MTZ10JA
★	D720	RD7R5JSB2 or HZS7R5JB2
★	D724	MTZ11JA or HZS11JB1
	L701 DC-DC Converter	CTX1007
	L702 Coil	CTF-113
	L703 (EW, WG)	CCG-081
	IB701	CWW-247
	IB702	CWW1034
	X701 Ceramic Oscillator	CSS-042
★ ★	VR251, 252 Semi-fixed, 680Ω (B)	CCP-315
	Pre Amp Unit	CWW1033
	Driver Unit	CWW1032

## RESISTORS

Mark	Symbol & Description	Part No.
	R253, 254, 707 – 717, 721 – 724, 727, 728, 743, 748, 749, 753, 761 – 767, 770, 772, 773, 775 – 781, 785, 786, 789, 791 – 793, 795 – 799, 804	RD1/4PS□□□JL
	R737 – 739, 774, 784, 787 – 790, 800	RD1/2PS□□□JL
	R760, 794	RD1/4PM□□□J
	Other Resistors	RS1/8S□□□J

## CAPACITORS

Mark	Symbol & Description	Part No.
	C251, 252	CKSYB391K50
	C253, 254	CEANL4R7M35LL
	C255, 256, 701, 702, 733	CEA220M16LS
	C257	CEA221M10L2
	C703, 704	CCSCH330J50
	C705 – 709	CKSYB473K25
	C710	CEAR22M50L2
	C711 2200μF/16V	CCH1001
	C712	CEA0R1M50LS2
	C713, 718	CEA100M25LS
	C714, 715	CEA4R7M35LS
	C719	CEA330M10LS
	C720	CKSYB102K50
	C721, 722, 725, 735 – 740	CEA101M16LL
	C723	CEAR47M50LS2
	C724	CEA010M50NPLL
	C726 – 732	CEA2R2M50LS2
	C741, 742	CQEA473J50
	C743, 744	CEA101M35L2
	C745 470μF/16V	CCH-114
	C746	CQEA104J50
	C747, 751	CEA470M16LS
	C748	CEA221M16L2
	C756, 757	CKSYB473K25

## Logic Unit

Mark	Symbol & Description	Part No.
★	IC711	μPD4538BG
★ ★	Q732	DTC124ES or UN4212
★	D801, 802	1SS133 or US1040M or
		1SS176
	R815 – 817	RD1/4PS□□□JL
	C771	CSZA2R2K16L
	C772	CQMA103J50LL
	C773	CSZAR47M35L

**R. Switch Unit**

Mark	Symbol & Description	Part No.
★	D951 — 953 LED	BG4524K
★★	S951 — 953 Switch	CSG-253

**L. Switch Unit**

Mark	Symbol & Description	Part No.
★	D954 — 956 LED	BG4524K
★★	S954 — 956 Switch	CSG-253

**Display Unit**

Mark	Symbol & Description	Part No.
★★	IC901 (ES)	PD4092A
★★	IC901 (EW, WG)	PD4091
★★	Q901	2SD1055F
★	D901, 902 LED	BG4524K
★	D903 (ES, WG) LED	BG4524K
★	D904 — 907 LED	BG5724K-P
★	D908 — 910 (ES, WG)	1SS133 or US1040M or 1SS176
★	D908 — 910 (EW)	1SS133
	TC901 (ES) Trimmer	CCL1006
	X901 Crystal	CSS1012
★★	S901 — 908, 910, 911 Switch	CSG-255
★★	S909 (ES, WG) Switch	CSG-255
	FL Tube (ES)	CAW1004
	FL Tube (EW, WG)	CAW1011
	R901 (EW)	RD1/4PS□□□JL
	C901 (EW, WG)	CCDCH100D50L
	C902	CCDCH100D50L

**Switch P.C. Board**

Mark	Symbol & Description	Part No.
★★	S1 Switch (CST SET)	CSN-089
★★	S2, 3 Switch (CST IN, 70μs)	CSN-091
	MR1, 2 Magnetic Resistive Device	SDME106A

**P.C. Board Unit**

Mark	Symbol & Description	Part No.
★	D1 — 3	1S1555

**Miscellaneous Part List**

Mark	Symbol & Description	Part No.
★★	HD1 Head Unit	CXA1214
★★	M1 Motor (Head)	CXM-452
★★	M2 Motor (Gear)	CXM-351
★★	M3 Motor (Capstan)	CXM-161
★★	S1 Switch (Door)	CSN-078
★	SO1 Solenoid (Door)	CXP1003
	Volume Unit (Complex Unit)	CWM1181

## 14. PACKING METHOD

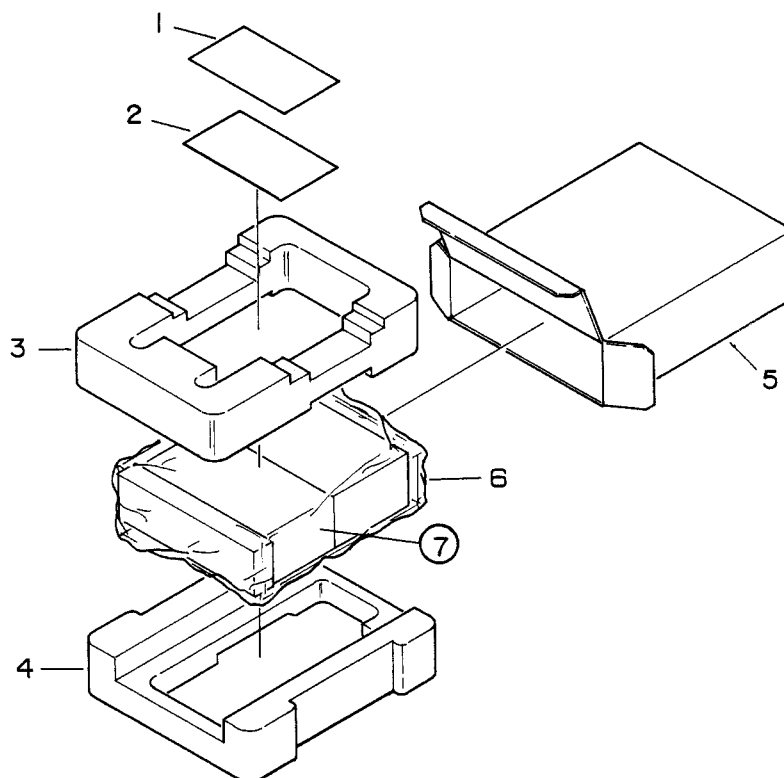


Fig. 21

### ● Parts List

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
	1.	CRD1082	Owner's Manual (ES) (English, French, Spanish, Arabic)		2-1-2.	CBA1002	Screw
		CRD1070	Owner's Manual (EW) (English, French, German, Spanish)		2-1-3.	NF50FMC	Nut
		CRD1071	Owner's Manual (EW) (Swedish, Norwegian, Dutch, Italian)		2-2.	CNF-111	Strap
		CRD1072	Owner's Manual (WG) (French, German) Card (EW, WG) Card (EW, WG) Caution Card (WG)		2-3.	CNF-382	Lever
		CNW-757	Holder		2-4.	CNV1009	Bush
		CNB1044	Panel Double-sided Seal		3.	CHP1042	Styrofoam
	2.	CEA1106	Accessory Assy		4.	CHP1041	Styrofoam
	2-1.		Screw Assy		5.	CHG1238	Carton (ES)
	2-1-1.	CBA-102	Screw			CHG1236	Carton (EW)
						CHG1237	Carton (WG)
					6.	CEG-114	Cover Holder
					7.		

